PUBLIC VERSION

Intelligent Cargo and Intelligent Network Port Logistics Chain Project

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1 Introduction

21st century changes in the business environment contributed to the development of logistics chain networks. As an outcome of this globalization and the proliferation of multinational companies, joint ventures, strategic alliances and business partnerships, significant success factors define optimized management practices. Technological changes, particularly the dramatic fall in information communication costs, which are a significant component of transaction costs, have led to changes in coordination between the members of the logistics chain network, particularly government agencies with trans-border responsibilities.

For the government agencies responsible for border management and cargo clearance, these new logistics chains require container/ cargo tracking because there is no single stakeholder who is responsible for the container, the cargo inside the container, its movement, and the border clearance process. This leads to ownership confusion, inefficiency, and human error along the logistics chain. Because current efforts in container transport are heavily based on manual labor, transit time is lost, errors are abundant with containers being frequently misplaced or misdirected, and security is limited. Because of this dependence on human intervention, these government agencies' resources are being stressed and the costs are rising for industries that are already realizing substantial price pressure and low profit margins. Increasing labor costs and the lack of sufficient government human resources have helped to fuel capital investment in machinery and other means to automate and optimize the container transport process.

The recent concern about terrorism has brought awareness as well as increasing desire for tracking and securing containerized cargo. A terrorist attack could bring containerized trade to a grinding halt, resulting in billions of dollars in losses. Since the logistics chain is comprised of many stakeholders working together, it is difficult to establish responsibility for containerized goods which leads to further problems in establishing security. Containers with tracking devices would be cleared at a much faster rate than traditional cargo. This would mitigate the problems associated with a terrorist attack.

Brasil enacted legislation in September, 2007 to create the Secretaria Especial de Portos, to develop policies and projects to support the development of the maritime port sector, which is responsible for handling more than 90% of Brasilian international trade cargo. Brasil recognizes the need to promote the modernization of its infrastructure and the streamlining of its operational procedures in order to facilitate the free flow of trade, reduce the stress on its own resources and reduce the costs to the private sector. At the same time, consideration must also be given to the requirements of international trade security to protect the world's economic lifelines from illegal actions, human smuggling, theft, and terrorist activities. As the Secretary General of the World Customs Organization, Kunio Mikuriya has said, "*Security and facilitation are two sides of the same coin*". The accomplishment of these objectives mandates improvements in information sharing and the elimination of institutional barriers that serve to impede the free flow of trade. The development of new procedural measures and state-of-the-art management technologies will serve to overcome these obstacles and assure the continued and responsible growth of trade between countries.

In early 2008, the US Trade and Development Agency (USTDA) funded a desk study to review the potential for secure supply chain technologies in Brasil. Of Brasil's 34 principal ports, 16 have significant container handling operations. The Government continues to invest in and provide incentives for continued expansion not only in the major ports but for more remote areas as well. To further improve efficiency, the Secretaria Especial do Portos has proposed development of "intelligent cargo" and "intelligent networks." Under the provisions of the contract with SEP, the Unisys Team is directed to provide SEP with the technical assistance required to formulate decisions regarding an Intelligent Cargo and Intelligent Network Port Logistics Chain (ICNCP). The project phases and requirements for each phase are summarized below:

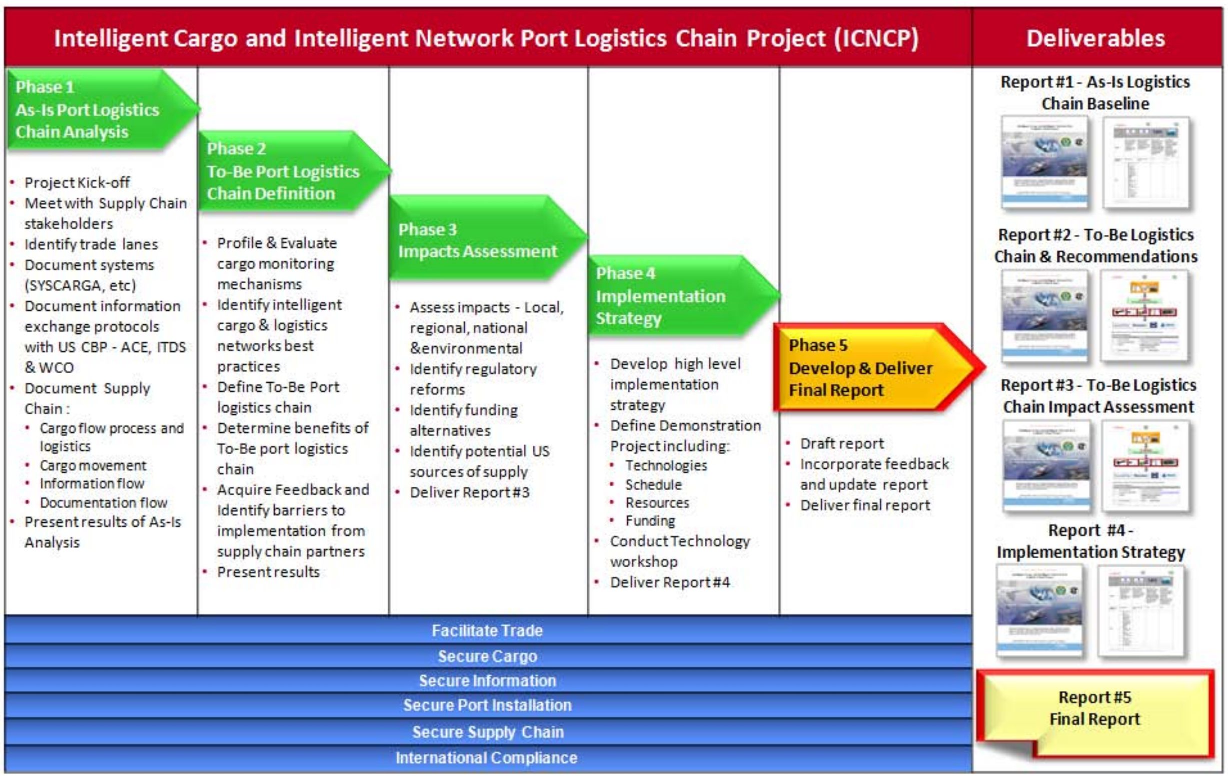


Figure: ICNCP Project Phases and Deliverables

Phase 1: Establishing the Logistics Chain Baseline

It is recognized that reaching a new destination first requires the traveler to know where he is starting from. The essential goal in Phase 1 was to fully understand the current processes in effect in Brasil's ports. This required that all relevant information be collected and closely studied. The results of Phase 1 were delivered to SEP in March 2010.

Phase 2: Defining the Intelligent Cargo and Intelligent Network Logistics Chain

The Unisys team reviewed and evaluated the current state-of-the-art in cargo monitoring technologies with both commercial and security applications. This assessment also evaluated the suitability of these systems for application in the Brasilian port logistics chain. An important component of this review was to identify best practices in intelligent cargo and logistics networks keying on monitoring capabilities and information sharing as well as data integration, data timeliness, and data reliability. The results of Phase 2 were delivered to SEP in May 2010.

Phase 3: Assessing the Impact of an Intelligent Cargo and Intelligent Network Port Logistics Chain

The Unisys team identified and assessed the potential impacts of implementing an intelligent port logistics chain which included focusing on infrastructure impacts, human resources, technology transfer, and productivity, and employment. Environmental impacts were reviewed to identify possible positive or negative impacts, considering possible mitigation efforts. Potential funding alternatives were examined for both public and private financing of an intelligent port logistics chain. A high level cost-benefit analysis was conducted as well as possible US and non-US sources of goods and services supplies for the project were identified. The results of Phase 2 were delivered to SEP in October 2010.

Phase 4: Development of an Implementation Strategy

The Unisys Team developed a high level implementation strategy for adoption of an intelligent port logistics chain. A critical component of this strategy was the identification of a proof-of-concept demonstration (Pilot) project to evaluate the ICNCP design. The Pilot project will serve as the basis for development of a strategy for full implementation.

Phase 5: Reporting

A substantive and comprehensive final report is being submitted at the close of the project encompassing all the above tasking and deliverables required by the contract.

Detailed information of the Intelligent Cargo and Intelligent Network Port Logistics Chain project phase results can be found in Section 3 of this Report.

2 Intelligent Port and Logistics Chain

To further improve efficiency, the Secretaria Especial do Portos collaborated with USTDA and the Unisys Team in the development of "intelligent cargo" and "intelligent networks." Under the provisions of the contract with SEP, the Unisys Team provided SEP with the technical assistance required to formulate decisions regarding an Intelligent Cargo and Intelligent Network Port Logistics Chain (ICNCP). As part of this project, the Unisys Team executed the project using the following five phase approach:

No.	Phase #	Phase Focus/ Name	Phase Timeline
1.	Phase 1	Establishing the Logistics Chain Baseline	February - March 2010
2.	Phase 2	Defining the Intelligent Cargo and Intelligent Network Logistics Chain	April - May 2010.
3.	Phase 3	Assessing the Impact of an Intelligent Cargo and Intelligent Network Port Logistics Chain	June - September 2010.
4.	Phase 4	Development of an Implementation Strategy	October 2010 – January 2011
5.	Phase 5	Reporting	January 2011

Documented below are the results of this effort conducted during these project phases.

2.1 Phase 1 - Establishing the Logistics Chain Baseline

This section represents Unisys' analysis of the existing supply chain. It provides an understanding of the current business processes, operations and information exchanges that occur in the logistics chain. This As-Is Baseline document performs the following:

- Introduces the various organizations involved in the import, export and cabotage logistics chains
- Documents the existing business processes
- Captures the existing documentation and transactions
- Identifies the existing issues inherent in the current cargo logistics operations within Brazil

As a result of the interviews, site surveys and follow up discussions, the Unisys Team developed As-Is Discovery documentation of each of the supply chain partners in each of the three supply chains which will form the basis of the As-Is Baseline detailed documentation in Section 5 of this report.

2.1.1 Current Systems – Logistics Information Network Systems

As per the scope of the ICNCP project, the Unisys Team reviewed the most applicable trade facilitation and cargo security systems, mandates and international requirements. For the purposes of this report, the Unisys Team has divided this section into subsections focused on U.S., Brazilian and International a) Systems/ programs and b) Requirements, mandates and regulations shown below:

Figure: Systems & Mandates/ Regulations evaluated

To provide further clarity, the Unisys Team has documented each of the systems/ mandates using the following format:

- **Description** providing a brief overview of the system or regulation/ mandate
- **Owner & Participants** listing out the lead/ sponsoring organization and the users/ participants of the system or regulation/ mandate
- **Functionality/ Requirements** providing the overall functionality and/ or the operational requirements of the system or regulation/ mandate
- **Benefits** of participating in the mandate and/ or utilizing the system to conduct operations
- **Challenges** to adopting and/ or implementing the system or regulation/ mandate
- **Security** focused on how the system of the system or regulation/ mandate helps improve cargo and/ operational security
- **Current status** listing out the operational status of the system or regulation/ mandate

International Trade Data System (ITDS)

Brief Description

The U.S. International Trade Data System (ITDS) is the mechanism for coordinating intergovernmental participation in U.S. Customs and Border Protection's (CBP) Automated Commercial Environment (ACE) trade processing system. According to Section 405 of the SAFE Port Act of 2006, the purpose of ITDS is to eliminate redundant information requirements, to efficiently regulate the flow of commerce, and to effectively enforce laws and regulations relating to international trade, by establishing a single portal system, operated by CBP, for the collection and distribution of standard electronic import and export data required by all participating government agencies (PGAs). It is meant to include all processes for advance screening and targeting, release of goods, payment of duties, taxes and fees, and post declaration processing.

ITDS was initially established in 1995 as a result of a report commissioned by Customs to make recommendations for the redesign of its commercial processing systems, a report issued by the Office of the Vice President regarding a more efficient and effective government, and a Vice Presidential Memorandum that chartered the ITDS Project Office and Board of Directors. In 2000, ITDS design and development were integrated with that of ACE, and in 2006, the SAFE Port Act provided a statutory basis for the ITDS program.

Currently, ITDS assists PGAs in identifying, documenting, and executing their plans to use ACE to improve their business operations and further their agency missions. This includes the creation and maintenance of the ITDS Standard Data Set (SDS), a comprehensive, harmonized collection of data requirements related to international trade and U.S. border regulatory and enforcement processes needed in ACE. The SDS elements to be collected, stored, and shared in ITDS are consistent with U.S. laws and compatible with the commitments of the U.S. as a member of the WCO and WTO.

Owner & Participants

ITDS is guided by an interagency Board of Directors, which is chaired by the Secretary of the Department of the Treasury and staffed by representatives of CBP and PGAs. The Board provides executive leadership and direction and works with PGAs on all issues related to ACE integration. There are also ITDS Board of Director Committees, working groups, and Integrated Product Teams that serve as forums for discussion and resolution of ITDS issues. Each committee plays a key role in guiding program efforts toward successful implementation of ITDS.

PGA involvement with the ITDS program has grown steadily since the passage of the SAFE Port Act of 2006, which mandated all federal agencies requiring documentation for the clearing or licensing of imported or exported cargo to participate in ITDS. PGAs have international trade missions including control over admission or export of cargoes, crews, and conveyances regulation of compliance with federal trade laws such as tariffs and quotas, licenses, and operating authorities promotion of international trade through activities such as export assistance and collection and reporting of statistical information about international trade and transportation. For ITDS purposes, agencies can be categorized as follows:

- Border Operations Agencies: have responsibility for the import, export, and transit trade processes related to cargo, conveyance and/or crew. Border Operations Agencies may also have license and permit, statistical, or trade promotion responsibilities. Border Operation Agencies sometimes are referred to as admissibility and export control agencies.
- License and Permit Agencies: use ACE as the primary means for the recordation and maintenance of license and permit information against. License and Permit Agencies may also have statistical or trade promotion responsibilities.
- Statistical Agencies: use ACE to extract trade or transportation data, usually not at the transaction-level, to support needs for their own statistical analysis. Statistical Agencies may also have trade promotion responsibilities.
- Trade Promotion Agencies: use ACE to facilitate U.S. trade by making available basic import and export information, such as rules and regulations, to the trade, service providers, and the public.

Functionality/ Requirements

The ITDS mission is to use a secure, integrated government-wide system to meet private sector and government requirements for the electronic collection, use, and dissemination of standard trade and transportation data.

ITDS responsibilities are to provide program oversight to achieve the mission communicate with PGAs, trade, oversight bodies, and CBP harmonize agency requirements reduce the data collection burden on the trade prevent and resolve disputes among agencies and identify resources required for the ITDS program. ITDS accomplishes activities in support of its mission in collaboration with CBP and PGAs. CBP is responsible for the implementation and integration of ITDS functionality within ACE through its Customs Modernization Program Office.

ACE consists of a mainframe application used to electronically submit data using several message exchange standards: proprietary, EDIFACT, X.12, and an internet-based web portal. Transport data is submitted by the carrier or the carrier’s agent and goods data is submitted by the importer or agent. This data is sent to and lodged with CBP. ACE receives, edits, and validates data, and then extracts relevant data and provides it to other agencies.

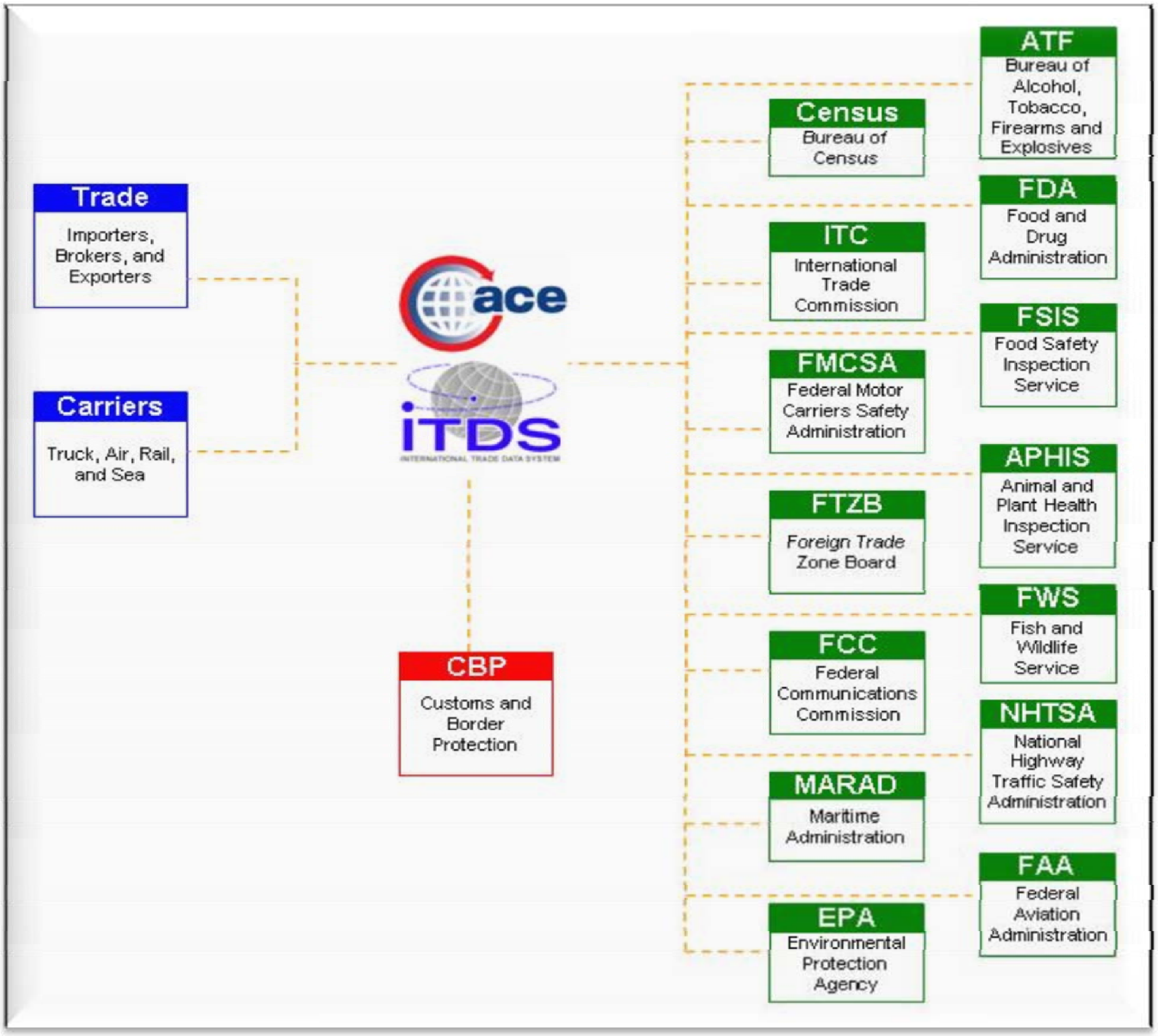


Figure: ACE/ITDS Functionality

The intent of ITDS is not to replace agency-specific systems, but to serve as a utility. In some instances, ITDS will transmit agency specific data to the existing agency system. In other instances, agencies will have selectivity and processing capability in ACE/ITDS. ACE/ITDS has also employed web technology to develop a web portal for agencies to access ACE/ITDS data for review and to generate reports of activity.

In order to participate in ITDS, trade participants must sign a letter of intent. Participants may develop their own in-house interface or purchase a software package from private vendors. All interfaces (in-house or private) go through a rigorous testing procedure to guarantee their ability to successfully interface with the government system. Agencies are able to access only that information which they have the authority to see. Trade users are able to access only that information pertaining to their transactions. Safeguards are built into ITDS to insure that users view only that information that they are authorized to see. Currently this is accomplished through passwords. Future capabilities will include policy key infrastructure and other security measures. ITDS works with CBP and PGAs to determine a foundation for PGA use of ACE. There is a specific group in CBP responsible for legislative review, and each PGA is responsible for the review of their existing regulations to determine whether changes to mandate electronic data collections are needed.

Benefits

ITDS provides benefits to the public, government, and trade community in terms of efficiency and accuracy, which translates into reduced costs and increased security.

Public

Citizens expect their government to protect them from unsafe food, dangerous goods, environmental concerns, security and terrorism concerns, unsafe vehicles, and the like. The lack of coordination among government agencies erodes the public's confidence in the government's ability to meet these basic concerns. The coordinated, integrated approach of ITDS will improve the government's ability to meet the public's expectations. It will also provide for decreased costs to government, which results in fewer burdens on the taxpayer, and greater facilitation of trade, which improves the economy as a whole.

Government

ITDS will result in decreased cost of system development, operation, and maintenance. Building one system is less costly than agencies developing and maintaining their own systems that require traders to interface with this variety of systems. The cost and burden of processing international trade transactions will also be reduced for government by decreasing the number of times each data element is collected.

The single collection of a standard set of data will not only decrease costs but it will also reduce the inadvertent and deliberate errors that result from transferring and translating information. This will produce more accurate and complete international trade data and facilitate more efficient flow of information between and among government agencies. Improved collaboration of border agencies and more timely data will encourage strategic targeting efforts and increased compliance. Targeting will be based on a risk-management approach that more precisely targets the highest risk people and cargo crossing the border and speeds all others—the low risks—even more smoothly through ports of entry and exit.

Trade Community

ITDS will provide importers, exporters, carriers, trade brokers, and trade advisors use of a single window filing interface and standard data set for import and export activity. The cost and burden of processing international trade transactions will be reduced for trade by reducing the number of times each data element must be provided.

Targeting will be based on a risk-management approach that more precisely targets the highest risk people and cargo crossing the border and speeds all others—the low risks—even more smoothly through ports of entry and exit. More timely cargo processing reduces costs and decreases the opportunity for pilferage.

Challenges

The development and implementation of ITDS is an ongoing process that has already spanned more than 15 years. Although great progress has been made, challenges have caused undesirable delays. The most damaging impediment has been the resistance to change and coordinate at the agency level. Initially, many agencies had unclear roles and inaccurate perceptions of the lead agency's intentions. Over time, proper information has been disseminated and accurate motivations have been realized, which has led to an increase in commitment of agency resources and inter-agency cooperation.

Lastly, ACE planning delays mean that ITDS agencies building automated systems to interface with ACE must put their own plans on hold. Delays also mean that agencies' expertise and commitment can be dissipated. Delays have led some agencies to consider postponing their work on ITDS, and some agencies have considered building independent systems for import filing. When funds are redirected to accelerate delayed releases, remaining ITDS functionality must compete for remaining funds.

Security

The ITDS initiative utilizes cutting-edge technologies to facilitate legitimate trade and travel. It is a focal point for supporting federal agency missions around border security. A program in CBP's Office of Information and Technology (OIT), ITDS is being developed within Automated Commercial Environment (ACE). ITDS coordinates the integration of federal agencies into ACE to streamline regulation promote and analyze international trade enhance enforcement of international trade regulations and laws and improve functionality for the agencies and trade community. These benefits will be achieved through unified business processes and single information collection points which will reduce paperwork and reporting burdens while improving federal agency capacity to secure U.S. borders and ports of entry.

ITDS will impact both border security and trade compliance within multiple federal agencies. ITDS helps detect, deter, and mitigate threats to the U.S. In addition, ITDS will also help safeguard critical infrastructure, property, and the economy from all threats facilitate lawful trade, travel, and immigration and protect confidentiality and data integrity to ensure privacy and security. ITDS will also improve the ability of PGAs to gather and fuse terrorism or other threat-related intelligence to make admissibility and export control decisions that are critical to preventing acts of terror. Other areas ITDS will clearly impact are counter-proliferation, keeping sensitive technologies from hostile hands, ensuring the safety of drugs and medical supplies, and preserving safe commerce.

Current status

ITDS development and implementation are currently in progress. It is one component of a larger customs modernization project, and much of its success is dependent upon related programs, such as the launch of ACE releases. This makes it difficult to project the length of time that it will take for ITDS to become fully operational.

There are currently 47 agencies participating in ITDS and 27 of those agencies already have access to the ACE Secure Data Portal. These agencies leverage data available via ACE reports to support their respective missions. CBP and PGA legal offices are currently working to finalize Data MOUs. All agencies responsible for import safety and eight other agencies have data MOUs in progress. Nine ConOps have been approved, 17 more have been presented to CBP for approval, and another 17 are being drafted. To date, no operational agreements have been completed.

Automated Commercial Environment (ACE)

Brief Description

The Automated Commercial Environment (ACE) is the United States' commercial processing system designed to automate border processing and enhance border security. Since 1999, ACE is being implemented in a phased effort to modernize customs processes and the technology that supports them. ACE is in the process of replacing current trade processing systems, including the Automated Commercial System (ACS), the Automated Export System (AES), the Automated Broker Interface (ABI), Border Release Advanced Screening and Selectivity (BRASS), the Customs Automated Forms Entry System (CAFES), Free and Secure Trade (FAST), and the Pre-arrival Processing System (PAPS). It will interface with the Advance Passenger Information System (APIS), the Automated Targeting System (ATS), the Interagency Border Inspection System (IBIS), the National Criminal Information Center (NCIC), and the Treasury Enforcement Communications System (TECS). It provides a technology foundation for all border security initiatives within U.S. Customs and Border Protection (CBP) and is intended to:

- Allow trade participants access to and management of their trade information via reports
- Expedite legitimate trade by providing CBP with tools to efficiently and effectively process imports and exports moving goods quickly across borders
- Improve communication, collaboration, and compliance efforts between CBP and traders
- Facilitate efficient collection, processing, and analysis of commercial import and export data and
- Provide an information-sharing platform for trade data throughout government agencies.

The primary business driver and legal foundation for ACE is the Customs Modernization and Informed Compliance Act (Mod Act). The Mod Act passed in December 1993 with the objective of improving the efficiency of the U.S. customs process. It outlined requirements for automation and emphasized electronic trade processing. The delivery of ACE capabilities will fulfill the Mod Act by enabling trade community users and CBP officers to electronically submit and retrieve import transaction data through an intuitive, standards-based, secure Web portal—the ACE Secure Data Portal. Portal, users are able to create and manage accounts, access reports, make payments, and submit electronic truck manifests. CBP also offers ACE users with optional email updates, reference and user guides, and online training programs.

Owner & Participants
The lead organization responsible for the ACE program is CBP, an agency of the Department of Homeland Security (DHS) of the United States. Participants include both public and private sector entities. ACE, through the International Trade Data System (ITDS), provides cross-border processing for all agencies of the U.S. government with border responsibilities. There are currently 47 such agencies participating in ITDS to realize the benefits of ACE. Private sector participants include importers, exporters, and their intermediaries in international trade transactions. The role of intermediaries under ACE will remain largely as it does in the current environment.

Functionality/ Requirements
ACE modernizes commercial trade processing systems with features designed to consolidate and automate border processing while providing a centralized online access point to connect CBP and the trade community.

The initial design and development of ACE led to the creation of the ACE Secure Data Portal, which was launched in 2003 with 41 importer accounts and CBP personnel supporting those accounts. The ACE portal is an interactive tool that provides a single gateway for access to CBP information via the Internet. Since its original establishment, ACE portal functions have been enhanced and have been made increasingly available. ACE has been deployed nationally to all land border ports, approximately 20,000 ACE portal accounts have been established, more than 50 percent of all duties and fees have been collected via periodic monthly statements in ACE, and 27 government agencies are currently participating in ACE. The portal now has three major user groups:

- CBP
- The trade community
- ITDS participating government agencies.

ACE portal accounts are created based on the company's organizational structure and provide a national account-based view of company information. There are many existing tools to help users better manage and organize the account, including single sign on for multiple accounts and restriction of individual user access within the account.

There are over 125 downloadable and customized reports available in the ACE portal. The reports feature can be used as a management business tool to analyze and track operational, financial, and compliance data. These reports can be tailored by setting filters, choosing specific data elements, sorting and organizing data fields, and customizing to an individual user's needs. Users can save reports to a personal folder save reports in Excel, PDF, or CSV files for data manipulation and analysis and schedule reports to run automatically. Report categories include Account Management, Account Revenue, Authorized Data Extract, Entry Summary, References, and Transactions (for truck carriers).

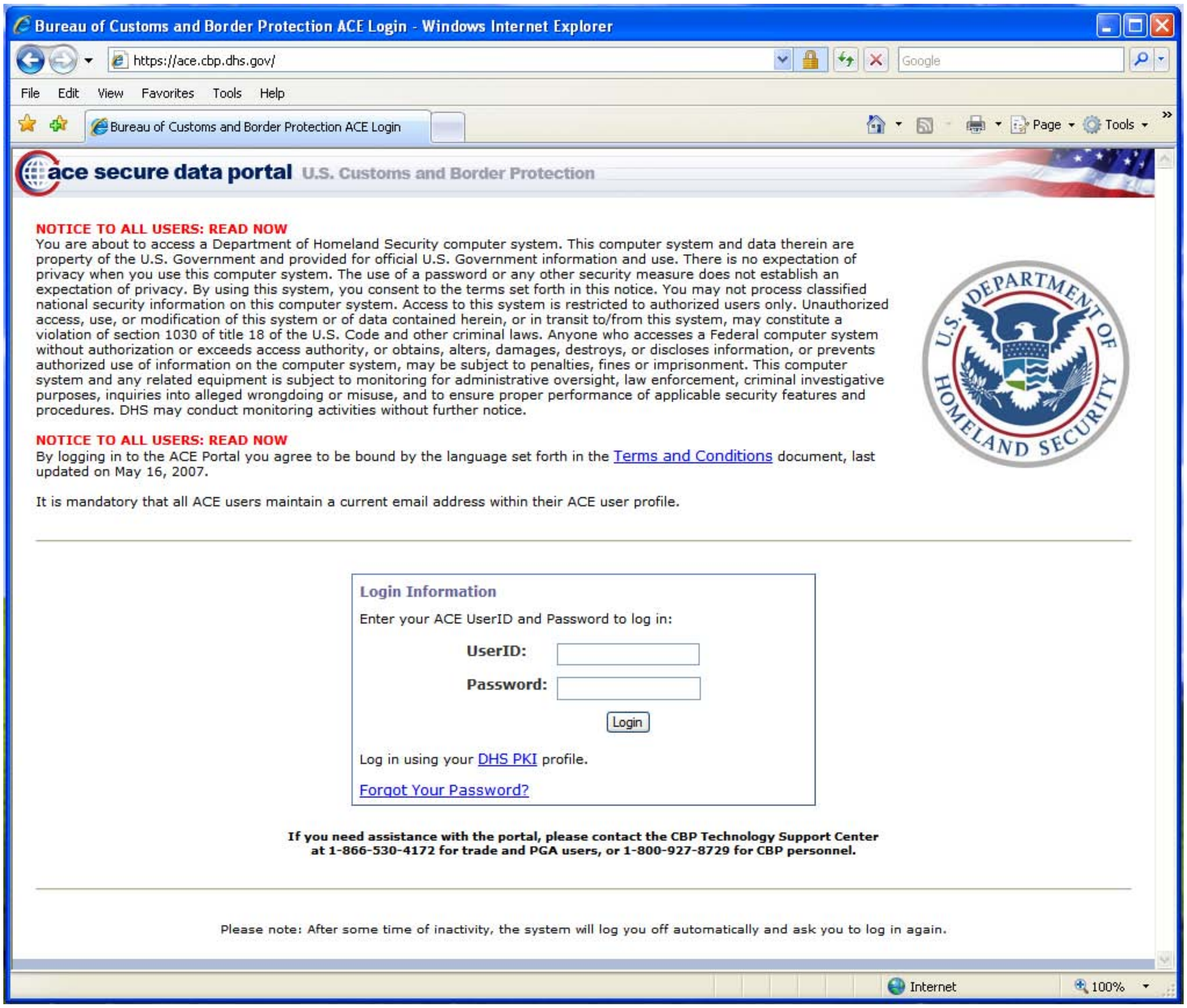


Figure: ACE Portal Log In website

Periodic Monthly Statement

Periodic Monthly Statement processing was introduced in 2004 and allows users to consolidate periodic daily statements and pay on a monthly basis. With the inception of the periodic monthly statement, operations for many filers have now changed from a day-by-day payment process to a consolidated account-based periodic monthly statement process. This process allows importers to pay for all eligible shipments released during the month on the 15th working day of the following month. Additional benefits include:

- Provide additional flexibility in the management of the working capital required for duty payments and potentially significant cash flow advantages
- Allow importer/filers to pay designated entry summaries for a given month on one statement
- Streamline accounting and reporting processes
- Allow the filer to select either a national or a port statement
- Allow the broker to pay on behalf of the importer

- Shift the payment process from a transaction-by-transaction payment process to an interest-free periodic monthly statement process and
- Allow users to view the periodic monthly statement as it is being built during the month.

More than $40 billion in duties and fees have been paid through the ACE monthly statement process since the first payment was made in July 2004.

Cargo and Control Release (CCR) Capabilities
ACE has improved cargo processing capabilities by introducing the Electronic Truck Manifest System (e-Manifest). Historically, carriers have been required to file a paper manifest with CBP before a shipment can enter the United States. Filing e-Manifests is now required at all land border ports in accordance with the Customs Border Security Act of 2002 (Trade Act of 2002) advance cargo rule.

An e-Manifest is the electronic submission of approximately 70 data elements, including trip, conveyance, equipment, and crew, passenger, and shipment information. It is submitted to CBP via the ACE Secure Data Portal, Electronic Data Interchange (EDI), or a combination of EDI and the ACE portal through self-filing or use of third parties. As a truck approaches the primary booth, ACE is used to retrieve e-Manifest information for the CBP officer to review. If the truck is equipped with a CBP-compatible electronic transponder, ACE will automatically retrieve e-Manifest details along with matching prefilled entries or in-bond requests. Prefilled entries are associated to manifests by the Shipment Control Number, which must be reported on both the manifest and the entry for e-Release to occur. E-Manifest for trucks helps create a secure and streamlined environment for processing and releasing cargo at the land borders.

In general, an e-Manifest must be received at least one hour prior to the truck reaching the first port of arrival in the United States. There are two exceptions:
- For Free and Secure Trade (FAST)/Pre-Arrival Processing System (PAPS) carriers arriving with shipments qualified for clearance under the FAST/PAPS program, an e-Manifest can be received at least 30 minutes prior to the carrier reaching the first port of arrival in the United States.
- For FAST/ National Customs Automation Program (NCAP) carriers arriving with shipments qualified for clearance under the FAST/NCAP program, a FAST/NCAP electronic declaration must be received at least 30 minutes prior to the carrier reaching the first port of arrival in the United States.

Entry Summary Processing Capabilities
Entry Summary, Accounts, and Revenue (ESAR) capabilities provide enhanced account management functions, a single source for master data and an integrated account-based, financial and entry summary processing system. ESAR capabilities will be deployed in phases. On September 9, 2007, CBP successfully deployed the first ESAR capabilities, known as Master Data and Enhanced Accounts (A1). Since that time, ACE has been the lead system of record for most master data elements required by any CBP system. This means the creation and maintenance of all master data elements and related reference files originate in ACE and are distributed to other CBP systems. With the deployment of A1, CBP has encouraged almost all

entities engaged in international trade to establish an ACE portal account. This expansion of account types has led to the growth in number of ACE accounts.

Cargo Systems Messaging Service (CSMS)

ACE also includes the Cargo Systems Messaging Service (CSMS), a subscription based, broadcast message system which provides CBP automated systems users with electronic updates via email. CSMS is available to CBP personnel and every trade community member. Anyone can sign-up to receive e-mail messages, and the database is also public. Subscribers may opt to receive wireless alerts to a provided e-mail address and may also select the delivery frequency (immediately, daily, weekly, or monthly). Subscribers may choose to receive messages from the following areas of interest:

- ABI
- ACE Outreach Events
- ACE Portal Accounts
- ACE Reports
- Air Manifest
- Ocean Manifest
- Rail Manifest
- Truck Manifest

Benefits

ACE will benefit the public, the trade community, CBP, other government agencies, and the economy as a whole.

Public Sector Benefits

- With the implementation of ACE, Citizens will be better protected from health and safety risks posed by terrorist activities and the influx of narcotics, illegal products, and unsafe goods. Also, moving goods to market faster and at lower cost will have positive impacts on the U.S. economy.
- At CBP, officers will benefit from state-of-the-art tools provided by ACE to perform their jobs faster they will have increased access to information, and the burden of paper-intensive manual processing of goods will be reduced. Government agencies with border enforcement and regulatory responsibilities will be better able to share information, which will improve analysis to better target and analyze goods coming into the country.

Private Sector Benefits

- ACE will provide importers, exporters, carriers, trade brokers, and trade advisors use of a single window filing interface and standard data set for import and export activity. The cost and burden of processing international trade transactions will be reduced for trade by reducing the number of times each data element must be provided.
- Targeting will be based on a risk-management approach that more precisely targets the highest risk people and cargo crossing the border and speeds all others—the low risks—even more smoothly through ports of entry and exit. More timely cargo processing reduces costs and decreases the opportunity for pilferage.

- In addition, ACE will benefit brokers in numerous ways. Brokers will be able to manage their account information online, view their account information and history, generate over 80 customized reports, and pay on a periodic monthly basis. ACE will also improve communications between brokers and their CBP counterparts by allowing online, live capabilities to send information and inquiries.

Challenges
The ACE project continues to make progress nonetheless, it has its challenges. Initially, ACE Releases have been delayed due to unanticipated design challenges and technical problems that have created the need for additional testing to ensure that capabilities function properly. Separate releases have been developed concurrently, which has led to cost overruns and schedule delays because releases contended for the same resources, and resources that were to be used on later releases were diverted to earlier ones. Delays have also been caused by the continual addition of the new requirements.

Security
Following the tragic events of September 11, 2001, the focus of ACE has been to support the CBP mission of protecting the American public against terrorists and the instruments of terror and enforcing the laws of the U.S. while fostering national economic security through the facilitation of lawful international trade and travel. ACE has also been aligned with the DHS mission and strategic goals. It will help reduce U.S. vulnerability to threats without diminishing economic security by providing threat awareness, prevention, and protection. ACE utilizes automated tools and information to decide—before a shipment reaches U.S. borders—what cargo should be targeted because it poses a potential risk and what cargo should be expedited because it complies with U.S. laws. It will impact both border security and trade compliance within multiple federal agencies.

ACE helps detect, deter, and mitigate threats to the U.S. In addition, ACE will help safeguard critical infrastructure, property, and the economy from all threats facilitate lawful trade, travel, and immigration and protect confidentiality and data integrity to ensure privacy and security. ACE will also improve the ability of federal agencies to gather and fuse terrorism or other threat-related intelligence to make admissibility and export control decisions that are critical to preventing acts of terror. Other areas ACE will impact are counter-proliferation, keeping sensitive technologies from hostile hands, ensuring the safety of drugs and medical supplies, and preserving safe commerce.

Current status
ACE is a live program that CBP plans to continue to acquire and deploy in 10 releases over a period of nine years. Each release will leverage the foundation components and functionality in the previous releases and bring new capabilities to the trade community and government users. ACE responds to growing demands and will supplement and replace existing legacy systems. Additionally, ACE is being integrated with the International Trade Data System (ITDS) to support the international trade data needs of each of the federal agencies with international trade responsibilities. The international trade processes supported by this initiative include data collection, processing, use, dissemination, and storage. Ultimately, ACE will become the central

data collection system for the Federal agencies that, by law, require international trade data. In addition, ACE will serve as the single point of access for this data. ACE is designed to provide trade compliance and border security staff with the right information at the right time while minimizing the administrative burden of non-value added tasks. ACE will impact multiple federal departments, agencies, and areas within these agencies.

The first release of Cargo Control and Release capabilities, known as M1, includes the following features:

- Validation of trade partner authorization to use custodial bonds to be maintained by the trade
- Extension of the 'broker download' functionality into the sea cargo environment
- Ability for CBP to place and remove holds at the container level
- Identification of un-manifested containers through vessel stowage plan
- Introduction of PGAs and new capability for the PGAs to place and remove holds and
- Retirement of ACS vessel and rail manifest processing.

The core programs supporting ocean and rail cargo control (manifest) processing were moved into the ACE environment in January 2009. Following that successful delivery, a work plan was implemented to update the core M1 programs with functionality required in M1 before it can go live:

- Gate-Out functionality
- 10+2 Importer Security Filing for ocean cargo and
- The linkage to the e214 Automated Foreign Trade Zone module.
- The pilot go live dates are yet to be determined. Following the completion of the M1 release will be the M2.1 release for the inclusion of air cargo processing into ACE Multi-Modal Manifest environment. M2.1 features:
- Inclusion of air cargo processing into ACE Multi-Modal Manifest environment
- Improves cargo control for CBP, brings PGAs into air environment, better information for CBP and PGAs
- Improved In-bond functionality and intermodal In-Bond cargo movements
- Holds at master, house, sub-house and simple bill of lading levels in air cargo
- Electronic transfer of bond liability between trade partners
- New report capabilities for trade partners and CBP field officers via the ACE Portal
- Broker download capability extended to air cargo environment and
- Expansion of second notify capability into air cargo processing.

1. Core and noncore processes have already been identified, which has allowed for the preliminary design phase to begin. The delivery date has not yet been determined however, when it is released, M2.1 will replace the legacy Air AMS.

Secure Freight Initiative (SFI)

Brief Description

The Secure Freight Initiative (SFI) is one of the multi-layer security systems of the U.S. Department of Homeland Security's Customs and Border Protection Bureau (CBP) that was mandated by Congress pursuant to Section 203 of the SAFE Port Act of 2006 and section 343(a) of the Trade Act of 2002, as amended by the Maritime Transportation Security Act of 2002. It is targeted for non-bulk cargo shipments arriving into the United States by vessel for the management, control, and protection of the nation's borders at and between official ports of entry. SFI installs non-intrusive container screening equipment in foreign ports. Together with local customs authorities U.S. CBP officers conduct radiation screening of containers. CBP is charged with keeping terrorists and terrorist weapons out of the country while enforcing hundreds of U.S. laws. The SAFE Port Act mandates that all marine cargo destined for the U.S. be screened prior to leaving the foreign port. The ultimate vision of the Secure Freight Initiative is to create a worldwide information network that establishes a tight ring of security that terrorists will find impossible to slip through.

Owner & Participants

The U.S. Department of Homeland Security (DHS) in partnership with the Department of Energy (DOE) and the Department of State is the lead organization responsible for SFI. Private sector and host government participants also play an important role by providing operational experience and appropriate balance between the SFI objectives of enhanced container security and efficient facilitation of global trade. Private sector participants include maritime terminal operating companies, shipping companies, and ocean carriers, and technology providers

Functionality/ Requirements

SFI's principal system is the International Container Security (ICS) scanning project, which provides for containers bound for the United States to be scanned for radioactive substances and X-rayed to display their content. It is the U.S. implementation of Pillar 1 of the SAFE Framework, sharing data government to government. All data and images are transmitted in real time to the host government Customs Officials, local Container Security Initiative (CSI) teams, and to CBP's National Targeting Center in the United States for analysis and integration with manifest data to determine risk levels. If the radiation detection equipment sets off an alarm, U.S. and host country personnel are notified at the same time. While official protocols for resolution of such a situation are still being developed through the pilot program, generally, if a radiation alarm is activated and is not resolved by review of the X-ray image, the container would then be subjected to a physical inspection. If the container is still considered high-risk, CBP personnel may request the terminal operator not to load the container onto the ship, or otherwise resolve the situation locally.

The Secure Freight Initiative builds on the current partnership between the CBP Container Security Initiative (CSI) and the DOE Megaports Initiative.

The Megaports Initiative works with partner governments to enhance their capabilities to scan as many import, export, and transshipped containers as possible for special nuclear and other radioactive material. This effort was developed in response to the concern that terrorists and nation-states of concern might use the global maritime shipping network to smuggle nuclear or other radioactive materials to locations where terrorists could utilize those materials to fabricate or detonate a nuclear weapon or radiological dispersal device. It became operational in 2003 as an expanded scope of the S Line Defense Core Program, which equipped 20 seaports in Russia. CSI works with host governments to inspect targeted, high-risk containers at participating foreign seaports, before they are shipped to the United States.

CSI officers use manifest examinations and other information to determine whether X-ray and radiation detection equipment should be used to examine U.S.-bound cargo. The SFI expands the use of scanning and imaging equipment to examine more U.S.-bound containers, not just those determined to be high-risk. At SFI test ports, the local CSI team continues to utilize the Automated Targeting System (ATS) as its primary targeting tool, prioritizing targeting efforts by working with foreign counterparts to resolve alarms associated with containers destined for the United States and containers that are deemed high-risk. However, the CSI team will now also receive and analyze data provided by the ICS systems to support these targeting efforts.
SFI is not intended to replace CSI. Rather, through ICS scanning, it represents the evolution of CSI by using advanced technology to identify containers that pose a risk to the global maritime supply chain. It is intended to build on the CSI mission to focus directly on the threat of nuclear and radiological weapons of mass destruction.

The SFI also enhances the integration of data. By using integrated scanning technology, including radiation detection and radiography, SFI ports should achieve a higher level of security by scanning more cargo without impeding the flow of commerce. Under SFI, an integrated scanning system, consisting of radiation portal monitors (RPM) provided by the DOE/National Nuclear Security Administration (NNSA) and non-intrusive inspection (NII) imaging systems provided by CBP, is used to scan containers as they move through the pilot locations in the foreign ports. Through optical character recognition (OCR) technology, data from these systems is integrated and provided to CBP officers who can use it, along with customary data sources, to determine if the container should be referred to the host nation for secondary examination prior to being loaded onto a vessel destined for the United States. More data-gathering capabilities have been added, through a variety of other programs. SFI provides additional data points used by CBP officers in conjunction with advanced manifest data, such as the Importer Security Filing (ISF), 24 Hour Rule information, Customs-Trade Partnership Against Terrorism (C-TPAT) information, and the Automated Targeting System (ATS) to identify high risk containers that warrant additional scrutiny prior to continuing on through the global supply chain.

The ultimate vision is to create a globally networked array of detection equipment that will be configured to enable real-time streaming of container images and radiological detection data to other countries engaged in maritime trade. This government-to-government data sharing will support stronger and more internationally harmonized risk reduction for global freight movement.

CBP uses the WCO's SAFE Framework network of Customs-to-Customs Partnerships and Customs-to-Business Partnerships as the key ingredients behind the CBP's globalization for supply chain security, and bases its framework of standards on the same four core principles as the WCO:

- Standardization of advance electronic cargo information requirements for inbound, outbound, and transit shipments
- Commitment to the use of consistent risk management approach to address security threats
- Performance of outbound inspection of high-risk containers and cargo by the nation from which the cargo was shipped at the reasonable request of the receiving nation, preferably using non-intrusive inspection equipment and,
- Adoption of Customs-to-business partnership programs (such as FAST and C-TPAT).

Benefits

Public Sector Benefits

- SFI provides government agencies an added layer of security data collection that increases the ability to make operational decisions to fulfill their mission of protecting the borders of the country.
- Using NII technology allows officials to determine with some degree of certainty that the cargo inside a container is safe from nuclear material. The outcome of these global actions is that global trade remains relatively safe. Participant nations benefit as they increase supply chain velocity, provide a higher level of predictability, and lower the costs across trade lanes.
- By applying security initiatives with member companies and member nations, the CBP has made great progress to enhance security worldwide.

Private Sector Benefits

- The increased layer of protection that SFI provides to international trade will result in security benefits to the public. Citizens of the U.S. and other participating nations will be less likely to experience the negative effects of terrorist acts.
- SFI also provides carriers of maritime containerized cargo with greater confidence in the security of the shipment transported and increases the likelihood for shippers and terminal operators that the flow of commerce will be both uninterrupted and secure.

Challenges

While there are many challenges to any new system of security and control, the following are the principal issues facing deployment of this program, many of them identified during the pilot program phase. According to CBP, the deployment of container scanning equipment at each of the SFI ports presented certain operational, technical, logistical, financial, and diplomatic challenges that will likely continue to be encountered, to varying degrees, as SFI deploys in additional locations. These challenges include:

- Identifying who will incur the costs for operating and maintaining the scanning equipment (the pilot program at the seven ports cost $60 million and CPB estimates that the initial cost for full implementation for 100 percent scanning is $870 million)

- Concluding agreements with partnering nations and terminal operators to document roles and responsibilities regarding issues such as: ownership, operation, and maintenance of the equipment sharing of information and import duty and tax considerations
- Reaching agreement with foreign and industry partners to continue scanning 100 percent of U.S.-bound containers after the pilot ends
- Sustainability of the scanning equipment in extreme weather conditions and certain port environments
- Staffing implications for both the foreign customs service and terminal operator
- Varying costs of transferring the data back to the United States (National Targeting Center) in real-time, etc.
- Re-configuring port layouts to accommodate the equipment without affecting port efficiency
- Developing local response protocols for adjudicating alarms
- Addressing health and safety concerns of host governments and respective trucking and labor unions
- Acquiring necessary trade data prior to processing containers through the SFI system
- Addressing data privacy concerns in regards to the scanning data and,
- Licensing requirements for the scanning technology.

The pilot demonstrated that more than scanning equipment is necessary to implement a successful scanning system. It requires a combination of technology, processes, and collaboration. Additional necessary factors include innovative solutions to operational hurdles, useful data that is collected, analyzed, and primed to enhance targeting, a collaborative approach with the international community and port operators, and perhaps most importantly, responsible and practical policies informed by the totality of the threats to which the U.S. remains vulnerable.

Security
SFI is a security program and all of its systems are directed at increasing border security. That security is increased by provided additional data concerning marine cargo that allows designated officials to make informed decisions about entry of that cargo into the commerce of the United States. The Secure Freight Initiative builds upon a risk-based approach to securing the international supply chain by leveraging programs like the NNSA's Megaports Initiative, which works with foreign governments to install specialized radiation detection equipment in order to deter, detect, and interdict illicit shipments of nuclear and other radioactive materials.

The information collected through SFI improves CBP the ability to identify high-risk shipments in order to prevent smuggling and ensure cargo safety and security. Congress recognized the need for more robust security targeting and passed the SAFE Port Act of 2006. Section 203(b) of the SAFE Port Act sets forth the following requirement to enhance the capability of CBP's Automated Targeting System that targets container imports:

> *The Secretary, acting through the Commissioner, shall require the electronic transmission to the Department of additional data elements for improved high-risk targeting, including appropriate elements of entry data . . . to be provided as advanced information with respect to cargo destined for importation into the United States prior to loading of such cargo on vessels at foreign ports.*

Prior to enactment of the SAFE Port Act, CBP had already undertaken an internal review of its targeting and inspection processes in recognition that physically examining every cargo container entering the United States would impose an unacceptable cost on the U.S. economy. Consequently, CBP had implemented a comprehensive strategy designed to enhance national security while protecting the economic vitality of the United States. The Container Security Initiative (CSI), the 24-Hour Rule, and the Customs-Trade Partnership Against Terrorism (C-TPAT) are cornerstone approaches implemented to further this goal. Additionally, CBP developed cargo risk assessment capabilities in its Automated Targeting System (ATS) to screen all maritime containers before they are loaded aboard vessels in foreign ports. Adding the SFI scanning element adds to the ability of CBP to target high risk cargo.

This new data will significantly enhance the risk assessment process by enabling CBP to more efficiently separate higher-risk shipments from lower-risk shipments that should be afforded more rapid release decisions. In addition, these additional data elements will enable CBP to make critical decisions during and immediately after elevated alert levels when business resumption is essential to the well being and security of the U.S. economy.

Current status

SFI was officially launched on December 7, 2006 with a pilot program for selected ports. Technology was deployed for full implementation to three ports, Port Qasim in Pakistan Puerto Cortés in Honduras and Southampton in UK. Limited deployment was made in four ports, the Brani Terminal at the Port of Singapore Gamman Terminal at Port Busan in South Korea Salalah Port in Oman and Modern Terminal at the Port of Hong Kong.

Each port was selected to determine the feasibility of 100 percent scanning of marine cargo bound for the U.S. After a full analysis of the pilot project it is expected that with sufficient funding, deployment of SFI technology will be made to the 51 foreign ports that are CSI participants. The SAFE Port Act of 2006 mandates 100 percent scanning of all inbound marine cargo by 2012. The results so far indicate that the date mandated by Congress cannot be met. In addition, the European Union has released its own study that 100 percent scanning of all cargo leaving the EU is not feasible or practicable.

Importer Security Filing (ISF) (10+2)

Brief Description

The Importer Security Filing and Additional Carrier Requirements (ISF) regulation, commonly referred to as the “10+2” initiative, is a component of U.S. Customs and Border Protection’s (CBP) Secure Freight Initiative (SFI). This rule requires importers and vessel operating carriers to provide advance trade data for non-bulk cargo shipments arriving into the United States by vessel to CBP.

ISF data is for security and targeting purposes only. It is not intended for commercial or trade enforcement compliance or for determining eligibility for entry. However, CBP compares the ISF to the entry data to analyze and assess risk and to validate the ISF data. The commercial data requirements remain under the Automated Commercial Environment (ACE) and its various components. This is an important distinction because of the various penalty provisions under the commercial filing data. The commercial regulations allow up to 15 days post import to correct commercial data and therefore avoid penalties. However, to help prevent terrorist weapons from being transported to the United States, Container Shipping Line s bringing cargo to the United States are required to transmit accurate security information to CBP about the cargo they are transporting prior to lading that cargo at foreign ports of entry.

Before the implementation of ISF, carriers were required to submit advance cargo information for vessels, including a vessel’s Cargo Declaration, to CBP no later than 24 hours before the cargo was laden aboard a vessel at a foreign port. This is generally referred to as the “24 Hour Rule.” This information had to be submitted to CBP via the Vessel Automated Manifest System (AMS). Carriers were not required to submit vessel stow plans or container status messages to CBP. And importers of record were generally required to file entry information, including CBP Form 3461, with CBP within fifteen calendar days of the date of arrival of a shipment at a United States port of entry and entry summary information, including CBP Form 7501, within 10 working days of the entry of the merchandise. Entry and entry summary information was submitted to CBP via the Automated Broker Interface (ABI) or via paper forms. Importers were not required to submit advance cargo information to CBP.

While the “24 Hour Rule” proved that import data could be gathered and transmitted in advance of a carrier’s departure, the effectiveness of the initiative suffered from inconsistent data quality. Pursuant to the statutory mandates of section 203 of the SAFE Port Act of 2006 and section 343(a) of the Trade Act of 2002, as amended by the Maritime Transportation Security Act of 2002, ISF was developed as a security program to improve CBP’s ability to identify high-risk shipments so as to prevent smuggling and ensure cargo safety and security.

ISF places responsibility squarely on the U.S. importer to provide accurate cargo descriptions, and imposes the real threat of substantial penalties for non-compliance, up to $5,000 for non compliance. To meet the security needs that CBP requires, importers are required to dramatically increase the level of data granularity reported. The importers' obligation for U.S. bound cargo requires the electronic filing of an ISF comprised of 10 data elements (ISF-10) the "10" in "10+2." For transit cargo, the importer must submit the electronic filing of an ISF comprised of five data elements (ISF-5). The carriers' requirement is to file two data elements (in addition to the data elements that they were already required to electronically submit in advance) for containers arriving via marine vessel the "2" in "10+2." The following is an illustration from

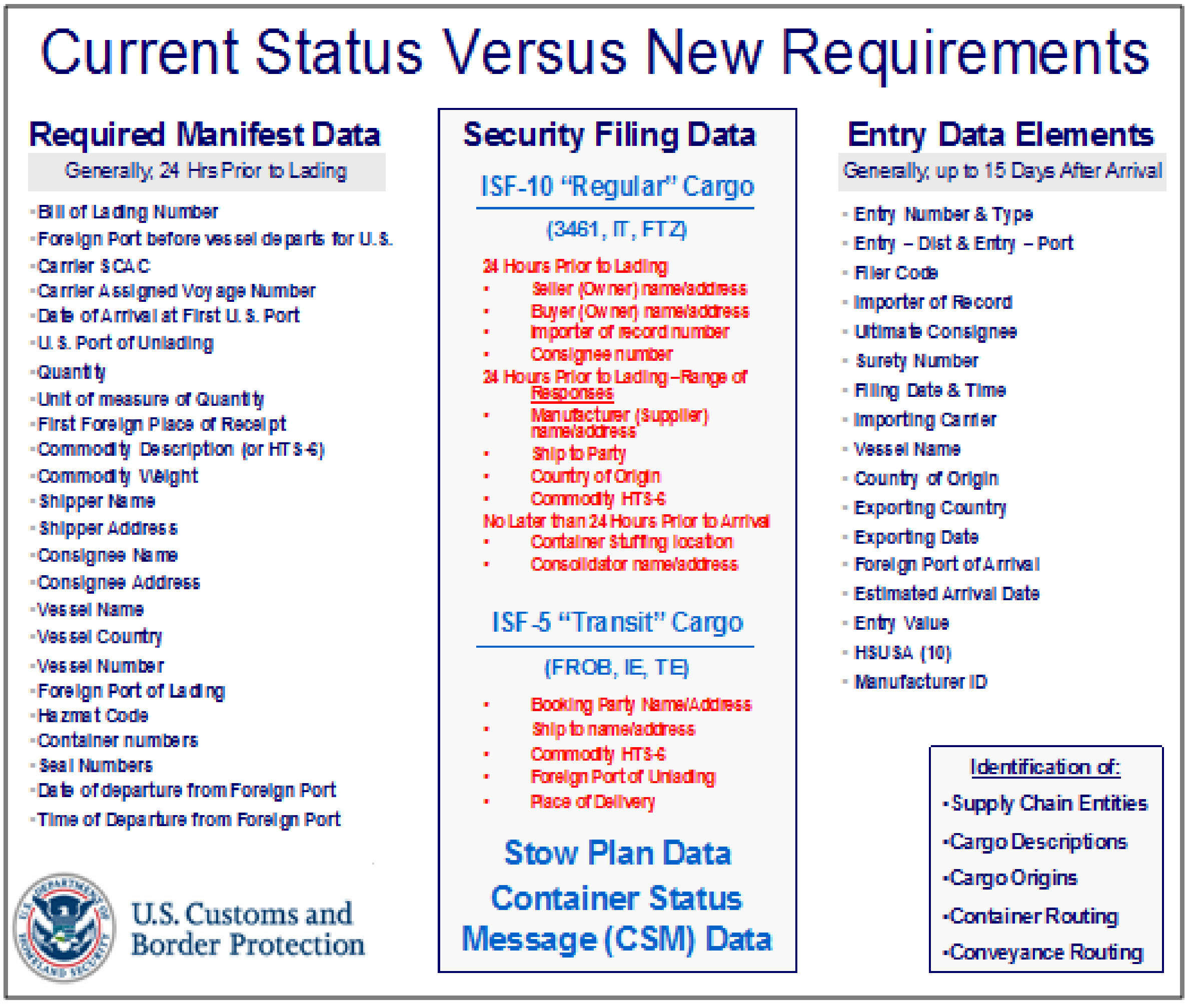


Figure: CBP 10+2 Requirements

Owner & Participants

The Secretary of the Department of Homeland Security (DHS), acting through the Commissioner of CBP is responsible for the development, implementation, and enforcement of ISF. Other participants include the appropriate U.S. government agencies charged with border security, importers, carriers, and other intermediaries of the transaction.

The participant required to submit the ISF is the party causing the goods to enter a port in the United States. This party is known as the "ISF Importer" who could be the owner, purchaser, consignee, or authorized agent (i.e. freight forwarder or customs broker). An authorized agent must obtain a Power of Attorney (POA). For foreign cargo remaining on board (FROB), this party is the carrier (vessel operating carrier or VOC). The VOC may hire a Non-Vessel

Operating Common Carrier (NVOCC), or another party, to be its agent for ISF purposes. The party filing the immediate exportation (IE), transportation and exportation (T&E), or foreign trade zone (FTZ) documentation is the ISF Importer for those types of shipments. The ISF Importer is ultimately responsible for the timely, accurate, and complete submission of the ISF filing.

Functionality/ Requirements

ISF requires importers and carriers to electronically submit additional security information to CBP before cargo is loaded onto an ocean vessel bound for the U.S. CBP uses the filing to identify high-risk shipments to prevent smuggling and to ensure cargo safety and security. CBP will return system messages to the ISF filer signifying acceptance, acceptance with warning, conditional acceptance, or rejection of the filing.

Importer Requirements

ISF Importers must transmit the ISF via a CBP-approved electronic data interchange system. The current approved electronic data interchange systems for the Importer Security Filing are ABI and vessel AMS. There are no provisions for paper forms (i.e., CBP Form 3461 equivalent). An ISF is required for each shipment at the lowest bill of lading level that has been (or will be) recorded in the vessel AMS system. CBP will accept an ISF at either the house bill of lading level or regular (i.e., simple, straight) bill of lading level. A single ISF may cover multiple bills of lading, and while ISF may naturally match up with CBP Form 3461 Entries, there is no actual requirement that they do so.

The 10+2 initiative requires ISF importers to transmit and ISF consisting of ten data elements to CBP for U.S. bound cargo—shipments consisting of goods intended to be entered into the United States and goods intended to be delivered to a Foreign Trade Zone (FTZ). For transit cargo—shipments consisting entirely of FROB and of goods intended to be transported as IE or T&E in-bond shipments—ISF Importers must submit an ISF consisting of five data elements to CBP.

ISF-10

For shipments Consisting of Goods Intended to be Entered into the United States and Goods Intended to be delivered to an FTZ, ISF Importers must provide eight data elements, no later than 24 hours before the cargo is laden aboard a vessel destined to the United States. Those data elements include:

1. Seller (Owner) name/address
2. Buyer (Owner) name/address
3. Importer of record number/FTZ applicant identification number
4. Consignee number(s)
5. Manufacturer (Supplier) name/address
6. Ship to Party
7. Country of Origin and
8. Commodity HTS-6.

For four ISF elements (manufacturer (or supplier) name/address, ship to party, country of origin, and commodity HTS-6) CBP allows importers, in their initial filing, to provide a range of

acceptable responses based on facts available to the importer at the time, in lieu of a single specific response (which may become known to the importer only at a later time). Importers will be required to update their filings with respect to these elements as soon as more precise or more accurate information is available, in no event less than 24 hours prior to arrival at a U.S. port (or upon lading at the foreign port if that is later than 24 hours prior to arrival in a U.S. port).
Two additional data elements must be submitted as early as possible, but no later than 24 hours prior to the ship's arrival at a U.S. port. These data elements are:

9. Container Stuffing location and
10. Consolidator (Stuffer) name/address.

Structure of ISF-10 Filing

- ISF Filer: ABI Filer Code or AMS Filer Code (SCAC)
- ISF Importer: Importer ID#* (CBP 5106)**
- Bond Holder: Importer ID# **and** Bond Activity Type (1, 2, 3, 4)

  If bond activity type 1, Subtype 8 (continuous)
  Subtype 9 (STB) **and** Surety Code
- Bill of Lading#: SCAC/bill # at house or regular (simple, straight) level
- Flexible Filing Option: Default is "No." May select "Yes"

1. **Importer of Record#:**	**Limited to one per filing**	6. Manufacturer (Supplier):	Multiple/Linked
2. Consignee#:	Multiple	7. Country of Origin:	Multiple/Linked
3. Buyer (Owner):	Multiple	8. HTS-6:	Multiple/Linked
4. Seller (Owner):	Multiple	9. Container Stuffing Location:	Multiple
5. Ship To Parties:	Multiple	10. Consolidator (Stuffer):	Multiple

Note: Container Numbers and Master Bill of Lading Numbers are OPTIONAL.

*In most cases, the ISF Importer and the Importer of Record Number will be the same.

**The ISF Importer must ensure that their importer ID number has been registered with CBP via the CBP Form 5106 process.

U.S. Customs and Border Protection

Figure: CBP ISF-10 Requirements

The bill of lading number is also required for ISF because it is necessary to properly link the ISF to the customs manifest data, which makes it commonly known as the "11th element." The ISF Importer must obtain this information and provide it to CBP as part of the ISF no later than 24 hours prior to vessel lading for ISF-10 filings.

For ISF-10 submissions there can be only one ISF Importer and one Importer of Record Number per filing. Also, the filing must be part of the same shipment and must be arriving on the same vessel as part of the same voyage.

The manufacturer (or supplier), country of origin, and commodity Harmonized Tariff Schedule (HTS) number must be linked to one another at the line item level, meaning that for each item of merchandise being imported, the ISF filer must tell CBP what the item is, who made or supplied the item and the item's country of origin. Line-item linking is not required at the container, bill of lading, or invoice level.
Four of the ISF-10 elements are identical to elements submitted for entry (CBP Form 3461) and entry summary (CBP Form 7501) purposes. These elements are the importer of record number, consignee number, country of origin, and Commodity HTS number. An importer may submit these elements once to be used for both Importer Security Filing and entry/entry summary purposes. If an importer chooses to have these elements used for entry/entry summary purposes, the Importer Security Filing and entry/entry summary must be self-filed by the importer or filed by a licensed customs broker in a single transmission to CBP no later than 24 hours prior to lading. In addition, the HTS number must be provided at the 10-digit level.

ISF-5
Cargo consisting entirely of goods intended to be transported as IE or T&E in-bond shipments must be received no later than 24 hours prior to lading. Because FROB is frequently laden based on a last-minute decision by the carrier, the ISF for FROB is required any time prior to lading. The five elements for transit cargo (ISF-5) are:
1. Booking Party name/address
2. Ship to name/address
3. Commodity HTS-6
4. Foreign Port of Unlading and
5. Place of Delivery.

Carrier Requirements
Security Filing Data Required from the Carrier includes Stow Plan Data and Container Status Message (CSM) Data.

Stow Plan Data

Figure: Vessel Stow Plan

Carriers (i.e. the Vessel Operator) are required to submit no later than 48 Hours after departure from the last foreign port a vessel stow plan only for vessels carrying Containerized Cargo for vessels destined to the United States. Vessels carrying only Bulk or Break-Bulk cargo are exempted (e.g., vehicle carriers).

For voyages less than 48 Hours the vessel stow plan is required prior to arrival. That Plan can be submitted through the Vessel Automated Manifest System (AMS), secure file transfer protocol (sFTP) or email.
The vessel stow plan must include standard information relating to the vessel and each container laden on the vessel, including the following standard information:

With regard to the vessel:
- Vessel name (including international maritime organization (IMO) number)
- Vessel operator and
- Voyage number.

With regard to each container:
- Container operator
- Equipment number
- Equipment size and type
- Stow position
- Hazmat code (if applicable)
- Port of lading and
- Port of discharge

Container Status Message (CSM) Data
Carriers are required to submit container status messages (CSMs) to CBP daily for certain events relating to all containers destined to arrive within the limits of a port in the United States by vessel. CSMs are required for empty containers. CSMs created under either the American National Standards Institute (ANSI) X.12 standard or the United Nations rules for Electronic Data Interchange for Administration, Commerce, and Transport (UN EDIFACT) standard are acceptable.

Carriers must submit a CSM when any of the required events listed below occurs if the carrier creates or collects a CSM in its equipment tracking system reporting that event. Carriers are not required to create or collect any CSM data other than those that the carrier already creates or collects on its own and maintains in its electronic equipment tracking system.

Carriers must submit CSMs no later than 24 hours after the message is entered into the carrier's equipment tracking system. The events for which CSMs are required are:
- Booking Confirmed
- Terminal Gate Inspection
- Arrives/Departs a Facility ("Gate-in, Gate out")
- Loaded or Unloaded from a Conveyance ("Loaded-on, Unloaded-from")

- Departs from or Arrives at a Port ("Vessel Departure, Vessel Arrival")
- Intra-terminal Movement
- Ordered Stuffed or Stripped
- Confirmed Stuffed or Stripped
- Shopped for Heavy Repair

Carriers may transmit their "global" CSM messages, including CSMs relating to containers that do not contain cargo destined for importation into the United States and CSMs relating to events other than the required events. By transmitting CSMs in addition to those required by this interim final rule, a carrier authorizes CBP to access and use that data. For each CSM submitted to CBP by the carrier, the following information must be included:

- Event code being reported, as defined in the ANSI X.12 or UN EDIFACT standards
- Container number
- Date and time of the event being reported
- Status of the container (empty or full)
- Location where the event took place and
- Vessel identification associated with the message if the container is associated with a specific vessel.

Carriers are exempt from the CSM requirement for bulk and break bulk cargo. Carriers must submit CSMs via the CBP-approved electronic data interchange system. The current electronic data interchange system for CSMs approved by CBP is sFTP. For Security Filing Transaction Sets CBP currently supports the following Stow Plan formats:

- UNEDIFACT BAPLIE SMDG v1.5
- UNEDIFACT BAPLIE SMDG v2.0
- ANSI X.12 324 v5010
- CBP currently supports the following Container Status Message formats:
- ANSI X.12 322 v4010/5010
- ANSI X.12 315 v4010/5010
- UNEDIFACT CODECO
- UNEDIFACT COARRI
- CBP may, in its sole discretion, accept other CSM formats upon request and review.

Enforcement

CBP will enforce the Importer Security Filing, vessel stow plan, and container status message requirements through the assessment of liquidated damages, in addition to penalties applicable under other provisions of law. CBP may issue liquidated damages of $5,000 per violation for the submission of an inaccurate, incomplete, or untimely filing. If goods for which an ISF has not been filed arrive in the U.S., CBP may withhold the release or transfer of the cargo CBP may refuse to grant a permit to unlade for the merchandise and if such cargo is unladen without permission, it may be subject to seizure. Additionally, noncompliant cargo could be subject to "do not load" orders at origin or further inspection on arrival. CBP will evaluate instances of non-compliance on a case-by-case basis and will consider factors surrounding potential violations before applying enforcement actions.

For the enforcement program CBP announced the following Mitigation Guidelines:

- First-violation: Liquidated damages claim may be cancelled upon payment of an amount between $1,000 and $2,000, depending on the presence of mitigating or aggravating factors, if CBP determines that law enforcement goals were not compromised by the violation.
- Subsequent Violations: If an ISF Importer incurs a subsequent liquidated damages claim for filing g a late or inaccurate ISF or an inaccurate ISF update, the liquidated damages claim may be cancelled upon payment of an amount not less than $2,500 if CBP determines that law enforcement goals were not compromised by the violation.
- No relief will be granted if CBP determines that law enforcement goals were compromised by the violation.

Benefits

Public Sector Benefits

- For CBP and other government agencies, ISF will identify entities, their locations, and the goods involved in the import supply chain. That data will significantly enhance the use of risk assessment to allow CBP to focus more efficiently on high-risk shipments.
- The shipment data will enable the U.S. Government to make critical decision during and immediately after elevated security alert levels when business resumption is essential to the functioning of the U.S. economy.

Private Sector Benefits

- The benefit to the private sector supply chain is the predictability that comes with a better assurance that the goods will be processed expeditiously by customs that will allow just in time deliveries. The alternative of 100 percent inspection is unacceptable. In addition, the recovery element of CBP to allow resumption of shipments quickly following an event cannot be overestimated.
- Despite the time and cost of complying with 10+2, best-of-class importers now see the rule as a hidden opportunity to optimize inefficient business processes in their global trade management operations and create competitive advantage. More effective management and visibility of additional trade data can:
    - Improve supply chain planning
    - Improve supply chain collaboration
    - Reduce inventory requirements
    - Improve visibility and controls of international transactions
    - Reduce landed cost

For example, an industry rule of thumb estimates that the cost of each additional day in transit is equal to half of one percent of the value of goods. Improving supply chain speed by just one day would be worth $500,000 per year for a company importing $100 million annually. Thus, the challenge for U.S. importers is to maximize the potential benefits of ISF, while minimizing supply chain cost and disruption.

Challenges
Challenges impeding full deployment of the ISF program fall into two categories, government and private sector. Keeping in mind that the objective of ISF as mandated by Congress is to collect accurate and timely data for security use in applying risk management techniques to identify high risk container and cargo.

Government

- Informing trade of the requirements and the process for compliance
- Encouraging importers to update their business processes
- Processing the data into the various CBP systems such as the National Targeting Center
- Obtaining Sufficient resources in the Targeting Center to process the increased data flow
- Maintaining Confidentiality of data collected:
  - Freedom of Information Act (FOIA) vs. Trade Secrets Act.
  - Policy is to treat ISF data submitted to Customs as confidential.
  - Customs regulation changed to limit availability of data under FOIA CFR 103.31a.
- Obtaining timely accurate data from the overseas suppliers, logistics handlers and other intermediates and,
- Verifying the accuracy of the data collected.

Private Sector
For the private sector, the challenges include:

- Timeliness, completeness, and accuracy of data
- Verification and correcting inaccurate data
- Inability to collect complete ISF data
- Costs:
  - The Bureau of Customs and Border Protection (CBP) analyzed the costs of this interim final rule. CBP estimates that the increase in costs of imported shipments will range between $48 and $390 per shipment, or between 0.13 and 1.03 percent of the value of the shipment. CBP estimated that the total annualized costs to the trade for 2009 to 2018 of this rule to be between $890 million and $6.6 billion at a 3-percent discount rate and between $990 million and $7.0 billion at a 7-percent discount rate.
- Determining best or most efficient process for providing the data to CBP:
  - Many software providers offer different solutions. Some are stand-alone packages with just the basics to be in compliance. Others are large, costly applications embedded with Customs Brokerage and Inventory Tracking.
- Confidentiality of data submitted.

Security
The information submitted in Importer Security Filings improves CBP the ability to identify high-risk shipments in order to prevent smuggling and ensure cargo safety and security. In response to the need for a balance between 100 percent screening of all imported cargo and the increased concern of terrorist activity using supply chains.

Prior to enactment of the SAFE Port Act, CBP had already undertaken an internal review of its targeting and inspection processes in recognition that physically examining every cargo container entering the United States would impose an unacceptable cost on the U.S. economy. Consequently, CBP had implemented a comprehensive strategy designed to enhance national security while protecting the economic vitality of the United States. The Container Security Initiative (CSI), the 24-Hour Rule, and the Customs-Trade Partnership Against Terrorism (C-TPAT) are cornerstone approaches implemented to further this goal. Additionally, CBP developed cargo risk assessment capabilities in its Automated Targeting System (ATS) to screen all maritime containers before they are loaded aboard vessels in foreign ports. Each of the initiatives is dependent upon data supplied by trade entities, including carriers, non-vessel operating common carriers, brokers, importers or their agents.

The information that CBP previously analyzed to generate its risk assessment prior to vessel loading contained the same data elements that were originally established by the 24 Hour Rule. For the most part, this is the ocean carrier's or non-vessel operator's cargo declaration. While this was a sound initial approach to take after the tragic events of September 11, 2001 internal and external government reviews concluded that more complete advance shipment data would produce more effective and more vigorous cargo risk assessments. ISF is focused on those specific data elements that further identify the entities involved in the supply chain, the entities' locations, as well as a corroborating and potentially more precise description of the commodities being shipped to the United States. This data will significantly enhance the risk assessment process by enabling CBP to more efficiently separate higher-risk shipments from lower-risk shipments that should be afforded more rapid release decisions. In addition, these additional data elements will enable CBP to make critical decisions during and immediately after elevated alert levels when business resumption is essential to the well being and security of the U.S. economy.

Current status

After four years of development, ISF requirements became effective in January 2009. To allow importers and carriers to comply with the new requirements a 12-month flexible enforcement period was conducted during which CBP provided extensive outreach to educate the trade community on the new requirements. Full compliance (enforcement) for the "10+2" requirements commenced on January 26, 2010. The timeline for development of ISF was:

- Advance Trade Data Initiative (June 2004)
- CBP Targeting Taskforce (March - May 2006)
- SAFE Port Act (October 2006)
- Consultative Process with the trade and other agencies (November 2006 - present)
- ATDI 10+2 Testing (February 2007 – November 2008)
- Notice of Proposed Rule Making Process (January - November 2008)
- Interim Final Rule Published (November 25, 2008)
- Effective date for implementation on a "flexible enforcement" basis (January 2009)
- Effective date for full compliance (January 26, 2010)

As the flexible enforcement period has ended, the guiding principle is to exercise the least punitive measures available to obtain full compliance. In order to achieve maximum compliance with the least amount of disruption to the trade and to domestic port operations, CBP will apply a measured, common sense approach to enforcement. This deliberative approach towards enforcement should not be viewed by the trade community as a further extension of the structured review and flexible enforcement period.

At the outset, CBP will concentrate its enforcement efforts on importers who are not filing ISFs for U.S.-bound shipments. At the very least, non-compliant ISF Importers should expect to receive a warning and/or will experience delays in the release of their cargo while CBP analyzes and mitigates the potential risk of the cargo. At a minimum, non-compliant importers should expect their shipments to undergo non intrusive inspection (NII) exam upon arrival in the U.S. As CBP's enforcement regime matures, non-compliant importers will continue to see increases in the amount of manifest holds and examinations, and will be subject to the greater use of stricter enforcement measures such as liquidated damages and do not load (DNL) holds. For C-TPAT companies that remain non-compliant, CBP will consider suspending, reducing and even revoking their C-TPAT status.

CBP has already received well over 3.4 million ISF-10s from over 1,900 ISF Filers representing more than 99,700 ISF importers with a 95 percent acceptance rate. CBP has also received more than 6,000 vessel stow plans and over 100 Million container status messages.

SISCOMEX

Brief Description
SISCOMEX – Integrated Foreign Trade System created by Federal Decree № 660, of September 25, 1992, is a computerized system that registers tracks and controls foreign trade transactions.

The application consolidates the core activities of the public organs involved in foreign trade:
- Secretaria de Comércio Exterior (SECEX)
- Banco Central (BACEN) and,
- Receita Federal

The main services rendered by the system are:
- Cargo Declaration to Receita Federal do Brasil (both import and export)
- Generation of Export Registration (Registro de Exportação - RE)
- Export Declarations (Declaração de Exportação - DE)
- Generation of Import Declarations (Declaração de Importação - DI)
- Information on the Parameterization of Import and Export declarations
- Control of incoming and outgoing ships and cargo flows on Brazilian shipping routes
- Computerized control of customs processes in special transit regimes and multimodal operations.

The SISCOMEX system includes the following modules:
- SISCOMEX Exportação (Export)
- SISCOMEX Importação (Import)
- SISCOMEX Transito (Transit)
- SISCOMEX Carga

SISCOMEX was originally a two-module structure, consisting of SISCOMEX Exportação and SISCOMEX Importação. The system then received two further implementations, the Transito version was designed to control cargo flows under special customs regimes, and SISCOMEX Carga was designed to improve Inland Revenue control over incoming and outgoing vessels and cargo in the Brazilian territory.

The main feature of SISCOMEX Carga is that it controls incoming and outgoing vessels at customs and excise ports, as well as import and export loads and empty containers from the time manifests are electronically transmitted to the system up to the moment the cargo is delivered to the importer or leaves national waters. Once in the system, the cargo manifests are cross-checked against the Import and Export Declarations via ports-of-call schedules, manifests and electronic knowledge interchange (CE - Conhecimentos Eletrônicos), all of which are automatically generated by the system as soon as the ship’s bill of entry and cargo manifests are uploaded into the database.

For each module the user must obtain a password and digital certificates to be determined by SERPRO (The Federal Data Processing Service). User profiles are categorized as per type of entity along the Export/Import chain.

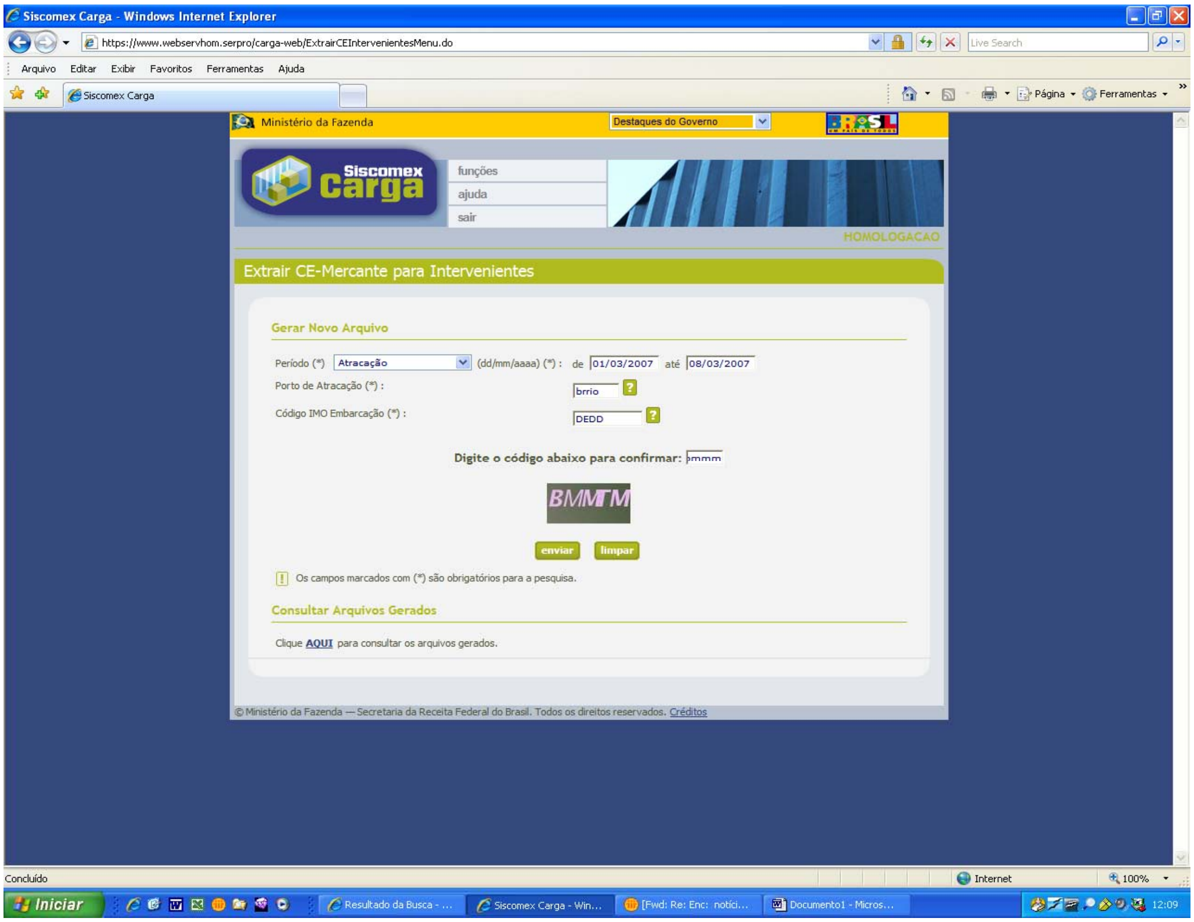


Figure: SISCOMEX Carga system

The SISCOMEX Importação module requires the payment of a usage charge, as set by Normative Instruction number 680, of October 2, 2006 and in accordance with “Art. 13. SISCOMEX usage Charges are payable upon submission of an ID, according to the following rates:

- R$ 30.00 (thirty reais) per ID;
- R$ 10.00 (ten reais) for items of merchandise added to the ID, with proportionally inverse rates depending on volumes added:
- up to 2 additions - R$ 10.00 each;
- 3 to 5 additions - R$ 8.00 each;
- to 10 - R$ 6.00 each;
- 11 to 20 - R$ 4.00 each;
- 21 to 50 - R$ 2.00 each; and
- 51 or more - R$ 1.00 each.

The rates to which the article refers are payable regardless of any duties leviable under art. 11"

Owner & Participants
The system is owned and operated by Receita Federal do Brasil and maintained by SERPRO. The system is integrated with:

- SECEX – Secretaria de Comércio Exterior;
- MDIC – Ministério do Desenvolvimento, Indústria e Comércio Exterior;
- BACEN – Banco Central do Brasil;
- DEFMM – Departamento do Fundo da Marinha Mercante

The following entities utilize the SISCOMEX platform:

#	System	User Community
1.	SISCOMEX Exportação	• Exporters • Customs House Brokers • Terminal Operators (for inclusion in Presence of Load – Presenca de Carga)
2.	SISCOMEX Importação	• Importers • Customs House Brokers • Terminal Operators (for inclusion in Presence of Load - Presenca de Carga)
3.	SISCOMEX Transito	• Customs • Importers • Cargo owners • Transporters • Port Authorities • Transit cargo transporters;
4.	SISCOMEX Carga	• Transporters (shipping companies and agencies, their partners and cargo agents) • Consignees (importers, commercial banks) • Terminal Operators • Cargo owners.

Functionality/ Requirements
Listed below are the functionalities and requirements of each of the SISCOMEX systems

SISCOMEX Exportação
SISCOMEX Exportação has the following functionality:

- Generation of Export Registrations (Registro de Exportação - RE). The first documental step in the exportation process, the RE is a compilation of commercial, financial, currency exchange and fiscal information that defines the export operation for the merchandise in question.

- Generation of the Export Declaration (Declaração de Exportação - DE). The DE is a document that supports the customs clearance of export goods by furnishing required information, particularly the contents of the RE. Once the Export Registration is included in the Export Declaration, the exporter (or legal representative thereof) completes the DE by adding further details concerning the Commercial Invoice, Maritime Bill(s) of Lading and duties paid to the relevant departments, such as the State Tax on the Circulation of Merchandise and Services (Imposto sobre a circulação de mercadorias e serviços - ICMS).
- The Cargo Declaration (Declaração de Carga) stating the presence of cargo is made by the depositary of goods at the dedicated area, which, in the case of exportation, will be either the Terminal or Operator Customs and Excise or a REDEX-status establishment (Export Customs Clearance Precinct) representing Receita Federal.
- Brazilian Receita Federal do Brasil response information on the Parameterization of the Export Declaration (DE). Parameterization is the fiscal analysis to which DE information is subjected by Receita Federal, resulting in one of the following classifications:
  - Green Channel: Immediate clearance of the goods;
  - Yellow Channel: Goods held for more detailed analysis of the documentation prior to clearance;
  - Red Channel: Need for more detailed documental analysis and physical/intensive inspection of the cargo prior to export clearance;
  - Grey Channel: Documental analysis, physical inspection and application of special customs control procedures.

For SISCOMEX Exportação, export registrations must be submitted 48 hours before the scheduled embarkation of export goods.

SISCOMEX Importação

SISCOMEX Importação has the following functionality:

- Generation of the Import Declaration (Declaração de Importação - DI). The DI is an electronic document formulated by the importer or the legal representative thereof that includes all relevant information on the imported merchandise. Among other details, this document must identify the importer and the requisitioner or consignee of the merchandise (if another party), and provide details on the cargo (volumes, weights, units of transportation), merchandise classification, customs and excise value, proof of origin and acquisition, and details concerning the exporter and producer of the goods.
- Generation of the Import License (Licença de Importação - LI). The LI gathers five pages of information on the merchandise and the operation:
  1) Basic proforma information (on the importer, nation of origin and Inland Revenue units)
  2) The supplier
  3) The merchandise
  4) The negotiation/transaction
  5) Complementary data (screen for additional information).

For some merchandise or special operations, subject therefore to special controls, the permit may either be issued automatically or non-automatically/prior to embarkation abroad. At present, only drawback operations receive automatic permits and are forwarded to the import customs broker in advance.

Cargo Declaration stating the presence of cargo is issued by the depositary at the Customs House Brokers, which, in this case, could be either at the Terminal or Port Operator.
For SISCOMEX Importação, import declarations must be submitted up to 90 days after the unloading of merchandise, otherwise the goods will be listed as abandoned cargo by Receita Federal.

SISCOMEX Transito
SISCOMEX Transito has the following functionality:

- Covers all transit operations between local units of Receita Federal.
- Controls the activities of transporters through electronic registries of national validity, general Terms of Responsibility for Customs Transit, guarantees, event management and suspension applications.
- Electronically controls cargo under the customs transit regime from the beginning of the operation to its conclusion.
- Enables an accurate snapshot of customs transit in Brazil through the daily updating of statistical data on the System.

SISCOMEX Carga
SISCOMEX Carga has the following functionality:

- Receives information on Cargo transported by vessels via the cargo manifest, along with copies of all corresponding intelligence that includes information on empty containers and transshipments to/from other ports in South America), and a list of all surplus items and onboard provisions.
- Generates the Cargo Identifier (CI). The CI is a code issued by the depositary responsible for Customs House brokers, informing that the offloaded or outbound cargo is under their responsibility.
- Notice of Vessel Loading and Unloading issued by the Port Operator

For SISCOMEX Carga some additional requirements include the following:

- Port-of-call schedules on the Mercante system is to be simultaneously reflected in SISCOMEX Carga system. This data input must be made 5 days before the ship's arrival at the first port-of-call in Brazil.
- Ship's manifests must be uploaded into the system's database at least 48 hours before the ship makes port.

Benefits
Listed below are the benefits of each of the SISCOMEX systems

SISCOMEX Exportação, Importação and Transito

- Help Receita Federal do Brasil control imports and exports as well as assist with documentation, rendering of accounts and foreign trade procedures

- The system allows exporters and importers to track the status of their goods and the parameterization applied to the different processes registered in the system, thus avoiding the need for a lot of paperwork to be exchanged between the Brazilian Receita Federal do Brasil and the Exporter or Importer (and/or their legal representatives).
- Integrates and controls the movement of cargo under special customs regime.
- Replaces the paper Declaração de Trânsito (DT) with a declaration made directly into the System, even before the cargo has arrived within customs jurisdiction at its destination.

SISCOMEX Carga

- Real-time information with multiple keys and the elimination of gaps
- Information-gathering from various operators
- Integrated analysis tools
- Single information window
- Minimal intervention in logistical flow
- “En route” customs clearance and elimination of logistical delays
- Clearance flexibility and reduction (or elimination) of storage time.

Challenges

The SISCOMEX systems have been developed on different technology platforms. For example, SISCOMEX Exportação is a mainframe system, SISCOMEX Importação is a standalone system and SISCOMEX Carga is a web-based solution. Due to the lack of a common platform, real-time internal and external integration is difficult.

Security

SISCOMEX Exportação, Importação, Transito and Carga require prior user registration with the Receita Federal, which will issue a password linked to a digital certificate connected, in turn, to the user’s Personal Social Security Number (Cadastro de Pessoas Físicas - CPF). User registration and password requests are made by completing and submitting a print form at any Inland Revenue Service agency, along with two photos to be attached to the documentation.

Current status

Listed below is the status of each of the SISCOMEX systems

<table>
<tr><th>#</th><th>System</th><th>Current Status</th><th>Future Plans</th></tr>
<tr><td>1.</td><td>SISCOMEX Exportação</td><td>Operational since 1992</td><td rowspan="3">Transition plan to integrate with SISCOMEX Carga by Q4 2010</td></tr>
<tr><td>2.</td><td>SISCOMEX Importação</td><td>Operational since 1997</td></tr>
<tr><td>3.</td><td>SISCOMEX Transito</td><td>Operational since 2002</td></tr>
<tr><td>4.</td><td>SISCOMEX Carga</td><td>Operational since 2008</td><td>Integration with SISCOMEX Export, Import and Transit by Q4 2010</td></tr>
</table>

Additional Information of the SISCOMEX systems can be found at the links below

- SISCOMEX Export
  https://www5.receita.fazenda.gov.br/g33159/jsp/logon.jsp?ind=09

- SISCOMEX Carga and Transit
  https://www4.receita.fazenda.gov.br/g33159/jsp/logon.jsp?ind=11

- SISCOMEX Import
  The system can be downloaded and installed in the user's computer via the following link:
  http://www.receita.fazenda.gov.br/Aduana/Siscomex/Importacao/Download/Download.htm

MERCANTE

Brief Description
The MERCANTE System provides the Departamento do Fundo da Marinha Mercante, do Ministério dos Transportes,, with computerized support in controlling livable additional charges on freight from the Bill of Lading to final crediting of the Departamento do Fundo da Marinha Mercante (FMM) account.

As representatives of the shipping companies, the agencies handling the information in the Bills of Lading use the Mercante system to electronically transmit all data concerning shipment. The cargo agents, in turn, conduct an electronic deconsolidation of the intelligence and inform Mercante.

The Mercante database formulates shipping statistics of a managerial and operational nature and these are then made available by the Department of Merchant Shipping to the various stakeholder segments of the public and private sectors.

Since its integration, on March 31, 2008, with the shipping cargo control module (SISCOMEX-Carga) of the Integrated Foreign Trade System (SISCOMEX), Mercante has forwarded all information Receita Federal do Brasil (Brazilian Interior Revenue Service) requires to carry out customs control with vessels, cargo and cargo units using Brazilian shipping routes.

Owner & Participants
The system is owned and operated by the Departmento da Marinha Mercante (DEFMM) and Ministério dos Transportes and supports Receita Federal.

The following entities utilize Mercante:
- Shipping agencies (shipowners)
- Cargo agents and terminals
- Consignees
- Importers

Functionality/ Requirements
Mercante has the following functionalities:
- Systemizes the handling of data from cargo shipping operations
- Promotes integration between the various institutional information systems of the Federal Government within the ambit of foreign trade, emphasizing the various systems of the SISCOMEX family, particularly SISCOMEX Carga
- Remove bureaucracy and cut operational costs incurred through customs clearance methods and procedures at ports
- Automates the levying of Additional to Shipping Charges for the Renewal of the Merchant Marine (AFRMM - Adicional de Frete para Renovação da Marinha Mercante) and improves the performance of Regional Units by establishing automatic control mechanisms
- Ensures total process management for the concession of fiscal benefits prescribed by Law.

Benefits
Access to Mercante System is available seven (7) days a week, 24 hours per day, promoting the reduction of bureaucracy and costs for all users, as well better planning and utilization of system resources by public and private sectors

Public Sector Benefits
- Ensures effective management of proceeds from the levying of additional shipping charges. It provides the support to control the tax revenues collection of additional freight from the Bill of Lading – CE, until the actual credit in the accounts linked to the Fundo da Marinha Mercante.
- Collects AFRMM through direct debit in current accounts

Private Sector Benefits
- It tells the value for each additional bill of lading and promote debt on their current accounts. The system electronically manages records of Master B/L and respective House B/L.
- The Mercante system database provides the statistics on transport, with operational and management information, which are offered by DEFMM to the various segments of public and private sectors interested in water transportation
- It allows to research on their various Bills of Lading, gathering information on the status of each, as the granting of exemption or suspension, requested by its representatives.
- De-bureaucratizes the procedures needed to clear cargos at port
- Reduces operational costs
- Consignees/Importers, responsible for the tax revenues collection of AFRMM, obtain from the Mercante System the additional amount related to it bill of lading and promote the debt on their current accounts.
- Makes advanced registration of data concerning the loading and offloading of vessels at national ports, in a differentiated manner, and to the criteria set by the intervenient

Challenges
Currently Mercante is being used in a limited fashion and may be phased out by the end of 2010.

Security
Mercante is accessed over the internet and, as with the other modules of the SISCOMEX system, connection is made through the use of a security protocol that uses a digital certification tied to the end user's social security number (CPF).
Current status
Currently being fully utilized by the logistics community and is expected to be incorporated by SISCOMEX Carga system.

Additional information of Mercante can be found at
https://www.mercante.transportes.gov.br/g33159MT/jsp/logon.jsp

Sistema DTE (Declaração de Transferência Eletrônica)

Brief Description
The Sistema DTE (Declaração de Transferência Eletrônica) was born of a public/private partnership between ABTRA and Receita Federal do Brasil – Santos (Santos Customs) with a view to controlling cargo transfers between the Port of Santos and the Customs House Brokers.

Owner & Participants
The system is owned and operated by the ABTRA (Brazilian Association of Terminals and Customs House Brokers)

The following entities utilize the DTE system:

- Cargo Agents and Port terminals
- Receita Federal do Brasil for Blockages and Releases
- Port Authorities

Functionality/ Requirements
The main functions of the DTE system are to:

- Control the transfer of cargos from the port to the Customs House brokers
- Control cargo storage in bonded warehouses under the jurisdiction of the Port of Santos, including customs regimes (Customs Transit Declarations)
- Standardize procedures and controls adopted by Customs House brokers

Benefits
The DTE system offers the following benefits:

- Reduced lead-times and optimized flow of logistical information
- Integration between the Santos Customs, CODESP (São Paulo State Docks Company), Customs House brokers and REDEX facilities (Special Export Customs Clearance Precinct).

Challenges
None at this time

Security
The DTE System is controlled by ABTRA (Brazilian Association of Terminals and Customs House Brokers), which stores and issues user profiles and passwords so that associates can access information on such events as ship Loading and Priority Requisitions, ship size and discharge, and bill closures.

Current status
The system has been in operation since 1995 and is currently scheduled for integration with SEFAZ (São Paulo State Finance Secretariat) and MAPA (Ministry of Agriculture, Cattle Raising and Supply). In 2010, DTE's target is to integrate with Finance Secretariat units in other States and with Anvisa (National Health Protection Agency). Additional information of the DTE system can be found at: http://www.abtra.com.br/portal/home.aspx

SUPERVIA System

Brief Description
In April 2001, the Santos Port Authority launched the first module of the SUPERVIA system, entitled Loading, the main function of which was to enable maritime agencies to make online requests for authorization to load ships

Owner & Participants
The system is owned and operated by the CODESP (São Paulo State Docks Company) and the entire port community utilizes the SUPERVIA system:

Functionality/ Requirements
The main functions of the SUPERVIA system are as follows:
- Makes available a whole suite of data concerning the scheduled arrival and departure of ships
- Information on ships anchored in the region of the port and the occupation of port terminals
- Real-time updates on the Santos port website

Benefits
The SUPERVIA system offers the following benefits:
- It offers an electronic way of managing the vessel berth allocation process.
- It is able to automate this process that occurs on average 460 times a month at the port of Santos.

Challenges
None at this time

Security
The SUPERVIA website uses a simple security protocol that consists of an access user profile and password, both previously registered on the system data base, administrated by CODESP (São Paulo State Docks Company).

Current status
Currently the SUPERVIA system is being fully utilized by the logistics community. Additional information on the SUPERVIA system can be found at:
http://www.superviadedados.com.br/security.asp?porto=SANTOS

Electronic Freight Management (EFM) Initiative

Brief Description

The Electronic Freight Management (EFM) Initiative is an open-architecture; Internet-based solution that allows supply chain partners to efficiently track freight shipments as they move through the supply chain. As global trade continues to grow, finding ways to improve the operational efficiency of moving this freight into, out of, and throughout a given country is critical to economic vitality. Freight movement, particularly international freight movement, involves a complex set of parallel processes related to the exchange of information between multiple entities and the transfer of goods within and between modes of transportation.

To understand these exchanges and where potential opportunities exist for improvement, the US Department of Transportation (DOT) worked with its private sector partners in the Intermodal Freight Technology Working Group (IFTWG) to create a freight process map that illustrates the physical movement of a container through a supply chain along with its associated information flow. The IFTWG is a public-private partnership focused on the identification and evaluation of technology based solutions for improving the efficiency, safety, and security of intermodal freight movement. Industry members come from the marine, trucking, and rail sectors together with third party logistics providers (3PL) and service suppliers. In structure and purpose, the relationship between the DOT and the IFTWG is not unlike that of Receita Federal do Brasil and Procomex.

Evaluation of this freight process map helped determine that the information transfer in freight movements is an area where improvements in speed, accuracy, and visibility could result in large rewards for the freight transportation industry. The EFM was designed to improve that information exchange. The genesis of what is now EFM dates back to 1996 and a White House Commission on Aviation study. While focusing on aviation security, the study recommended additional research into the trucking industry and its interface with air cargo. This study was followed by an expanded program launched in 1997. Managed by the US Federal Aviation Administration, it continued research into the truck-air cargo interface. Completed in 2000, this study led to a larger initiative to create a multimodal electronic cargo manifest and, most importantly to EFM, automated data transfer across transportation nodes and political jurisdictions. This study, the Electronic Supply Chain Manifest initiative, ran through 2002 and integrated biometric smart cards with a secure Internet-based cargo transaction system. In 2004, the scope was expanded to include international data standardization and more robust web services. DOT worked closely with the International Organization for Standards (ISO) on the data standardization objective and developed the requirement that became the EFM. The EFM research team produced its preliminary design report in 2005 with the final design following in 2006. A pilot program was conducted in the 2006-2008 timeframe involving Limited Brands, an air cargo supply chain originating in China and terminating in the company's distribution centers in Columbus, OH. Commercial usage of the EFM initiative began in February 2009 with its implementation by the DEMDACO Company in Kansas City, MO.

EFM is intended to provide an information sharing alternative for firms that presently use fax, email, or telephone as the primary means for communicating with their supply chain partners.

Such methodologies are inherently labor intensive, inefficient, and paper-focused. Typical documentation may include information regarding booking numbers, container numbers, weights, Container Shipping Line and name, consignee, trucking company, driver name, customs declarations, inspection certifications, and finance and tax documents. EFM allows each supply chain partner to exchange data with other supply chain partners through web services using eXtensible Markup Language (XML) data standards. All partners in the supply chain communicate with each other through EFM, from shippers to 3PL providers, to customs brokers. Data is extracted from each partner’s existing system – there is no need for repetitive data entry after the shipment origination by the manufacturer. This creates an integrated, shared-view of the status of shipments across the entire span of the supply chain. EFM provides the classic single window solution for stakeholders in a supply chain by entering the data that all partners will use through a single entry point into a system shared by all – one window.

In Brazil, a conceptually similar program, Porto sem Papel, is under development. It will facilitate the exchange of data between standardized information systems that already exist, serving as a gateway to information on port operations. The chart below illustrates the partners in a typical supply chain and their interrelationships. All are potential beneficiaries of an EFM solution.

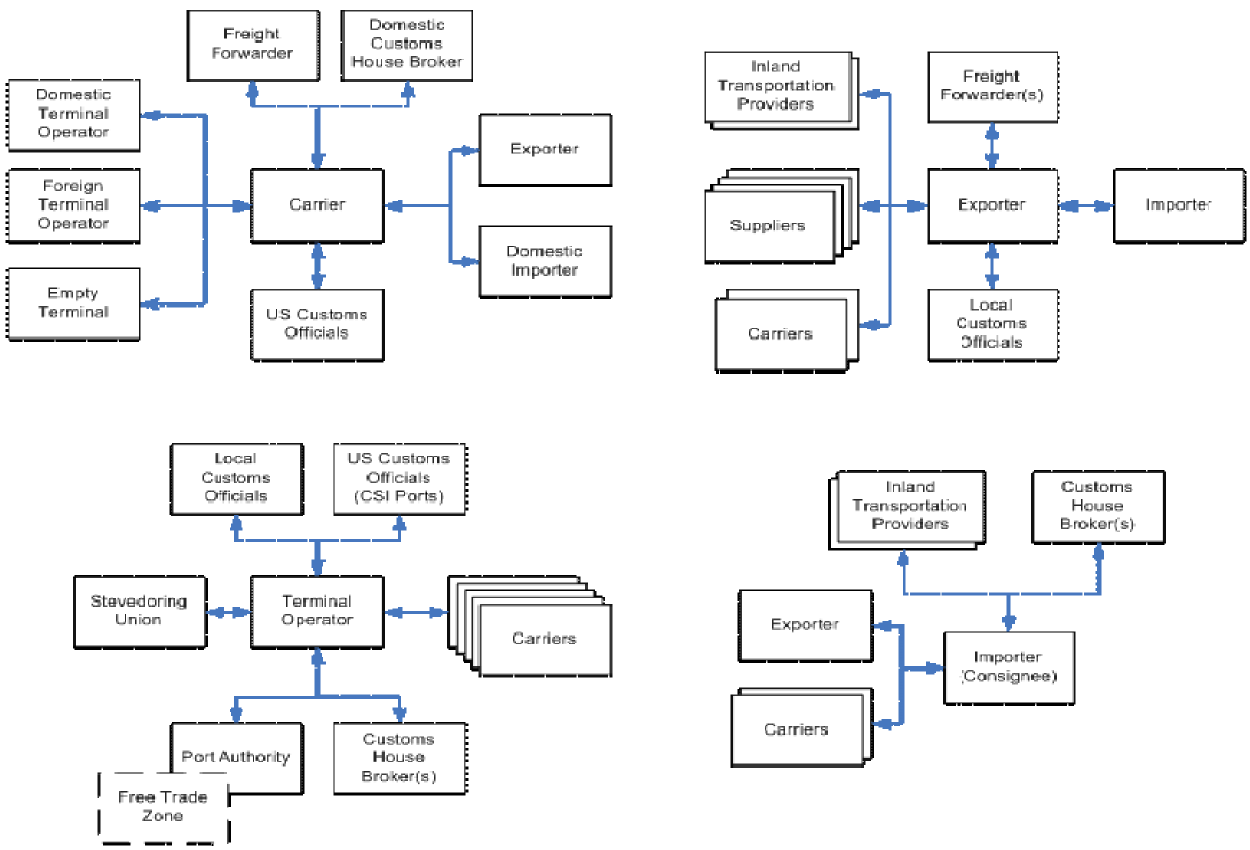


Figure: Representative Supply Chain Partner Relationships

Owner & Participants
The EFM Initiative is a logistics information network project sponsored and developed by the US Department of Transportation. Administered by the Federal Highway Administration, EFM was developed in coordination with input from national and international organizations such as the International Standards Organization (ISO), the National Institute of Standards and Technology (NIST), the World Customs Organization (WCO), US Customs and Border Protection (CBP), and the Federal Aviation Administration (FAA). It was initiated to provide a common electronic communication platform for partners in a given supply chain. While DOT is the sponsoring agency and provides the system architecture and source codes to participants, the actual network and database is exclusive to the supply chain owner who is the "owner" in every sense of the word. Access is available only to the supply chain owner and those participants authorized by the owner.

Typical participants might include the importer/exporter, manufacturer, third party logistics provider, freight forwarder, customs broker, trucking company, warehouse operator, steamship line, container terminal, etc. A representative example of an EFM supply chain partnership is illustrated by the diagram below:

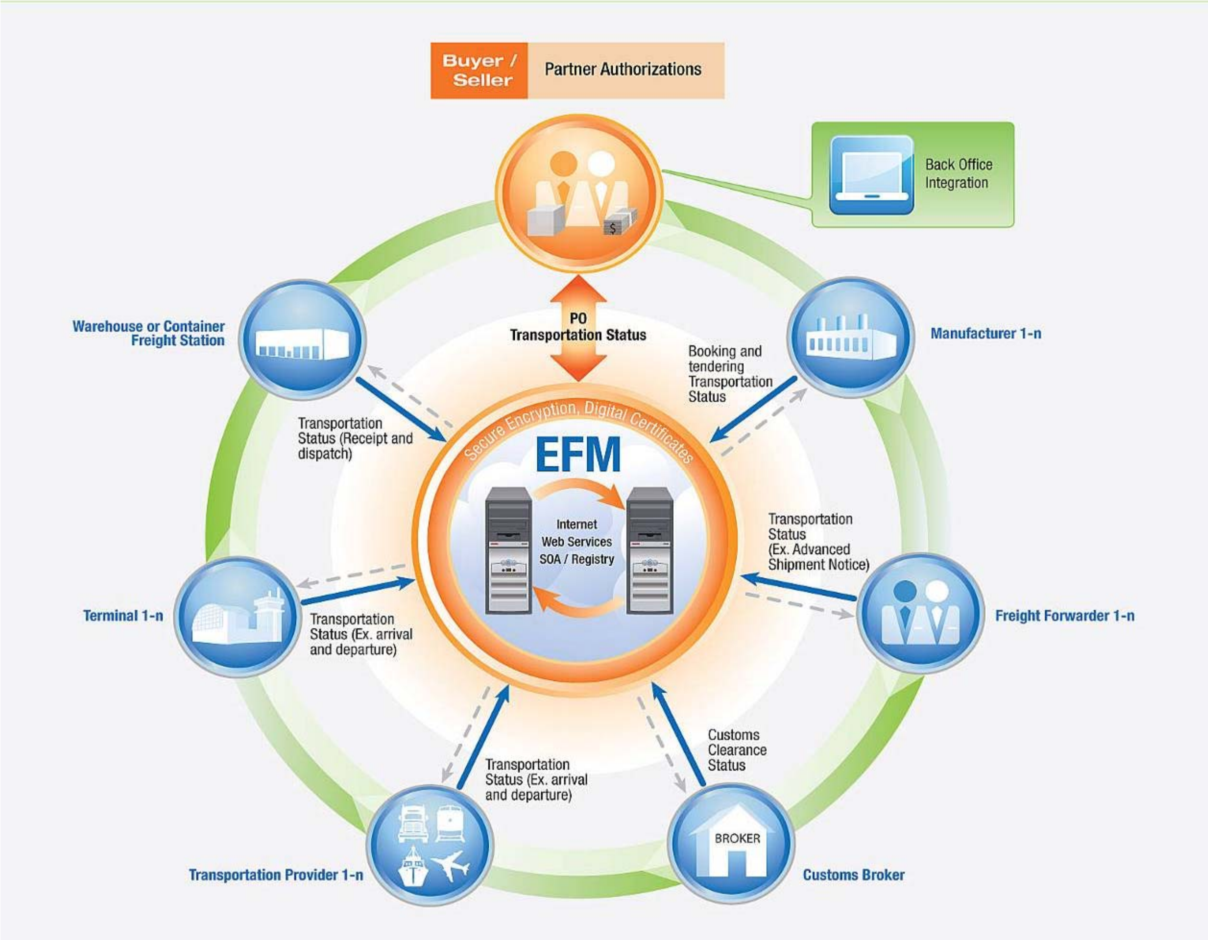


Figure: Representative EFM Supply Chain Participants

Functionality/ Requirements

As the Figure above illustrates, EFM serves as the hub in the wheel tying all the supply chain partners together. In using DOT's model for implementation of EFM, the supply chain owner first defines the scope of the supply chain. This requires identifying the supply chain processes that should be captured by the EFM system. Because the typical supply chain involves multiple partners, multiple modes of transportation, and international borders, EFM uses the WCO-developed Unique Consignment Reference (UCR) to establish a unique identifying number for an international movement of goods. The UCR was developed in the late 90s to identify a specific commercial transaction and to facilitate the exchange of information along the length of the supply chain, from initial order to final delivery. Officially adopted in 2004, use of the UCR serves to bind together all documentation generated by the partners in the supply chain – like an "electronic staple." It provides a common reference for various waybill, bill of lading, container numbers, etc., that are assigned to the shipment and used by partners for internal tracking.

To assist in identifying the supply chain processes of each partner, EFM provides a survey instrument to describe the partner's role and technology capabilities. Templates are also provided to map the supply chain from each partner's perspective. The IT developer, whether in-house or contract, assists by determining the level of integration possible with the existing systems of the partners.

The owner classifies each partner as (1) a data provider, (2) a data consumer, (3) both provider and consumer. The owner controls what data is provided to each partner. Only partners authorized by the owner may access certain shipment records. The mapping process also identifies the data to be exchanged. All users must identify their output data and reporting requirements. They will need to determine which of their existing logistics system output products must be included in EFM for updating. Manual documents can be converted to XML documents using web services provided by EFM.

At this point, owners are ready to determine which of three EFM functional models are appropriate to their needs.

Web Portal Model

This enables partners to view supply chain data online. Access to an Internet browser is all that is required – no additional software is necessary. In this model, shipment data and status messages can be viewed but providing additional data or responding to other partners requires manual inputs. Partners with existing logistics systems would need to rekey data to take advantage of EFM's capabilities. This is the least costly implementation model, the "bare bones" option that may be attractive to a small business seeking an entry-level system. Users enjoy the advantages of the technology but the required data rekeying reduces the full benefits of automation.

Hybrid Model

This provides a middle ground between the Web Portal and Fully Integrated options. The company's existing logistics system remains isolated from EFM and simply links to it. The existing logistics system serves as the data source while EFM acts as a database manager that routes consignment information in a secure environment with XML messaging and web services. This model is attractive to some supply chain partners who may prefer a staged transition to fully integrated EFM. However, data received from other partners must still be keyed in or manually transferred from the EFM server into the company's logistics system – it does not provide automated access to all EFM data. It is therefore generally regarded as an interim or transition step to full integration for small to medium sized, technically savvy companies.

Fully Integrated Model
This provides a seamless electronic transfer of key data with a company's own logistics system, eliminating the need to rekey this data. EFM's web services function allows the internal logistics system to be automatically populated and updated. This model requires a server, either a virtual server (dedicated space on an existing server) or a separate dedicated server. The most attractive option for medium to large technically savvy businesses that can take advantage of the full-featured system.

Once the owner has selected an implementation model, the design details must be established by the IT developer working with the owner's operations staff and the supply chain partners. DOT facilitates this development by providing a dedicated EFM Package which provides guidelines, checklists, templates, and architecture components. This enables the owner to develop the underlying infrastructure, or basic platform, on which the EFM web services operate and includes the security and network operations that transfer data via the Internet between authorized EFM partners. It also includes specific application software which implements the configurable JAVA-based web services.

If the Web Portal model is selected, the developer will need to create the use cases for each of the data exchanges with each partner and determine which of the web services can be used as-is, which need revision, or whether additional web services are required. If the Hybrid or Fully Integrated models are chosen, the developer will need to build the appropriate software interfaces to obtain the required data from existing systems for sharing by all partners.

EFM affords the user considerable flexibility in structuring the system to meet their individual needs. EFM can be installed directly in each partner's data center to serve as a common set of software for exchanging UBL-based messages. If it is not possible to install EFM software, proxy servers can be deployed and hosted to stand in for the actual partner. The number of servers needed depends on a number of factors including:

- The number of partners involved
- The mechanism used to integrate EFM partners (real or hosted?)
- Scalability/transaction volume/performance requirements
- Security/enterprise boundaries

While it is desirable to host the database and application server on separate servers, this is not a requirement. In the optimum implementation environment, each partner in the supply chain hosts their own installation of EFM. If, on the other hand, the owner provides proxy EFM services, servers will be required for each partner. Servers for other ancillary services may also be needed – for example FTP, file shares, and email servers.

The EFM software architecture includes a module for electronic data capture for capturing partner legacy data. Legacy data may be pushed from the supply chain partner via FTP, ssh, sFTP, or other protocols. Legacy data may also be pulled using the same set of typical protocols. The format of the data in both cases can be virtually any format as long as it is able to be parsed in a consistent way. A legacy data adaptor is also provided which features a variety of data transformation services to convert information from a legacy format to standard UBL. These features ensure that data input and output is fully automated, obviating the need for repetitive manual data entry.

Because the EFM IT guidelines are already written and available to users, implementation is straightforward. Once the interface with the legacy system is established, training requirements are reduced to instructing users to use the web interface and the EFM products. Since EFM integrates existing systems, users are not required to learn a new, completely separate system. The requirement has been likened to learning the new features of the latest upgrade to any familiar software program. The chart below displays the implementation process graphically:

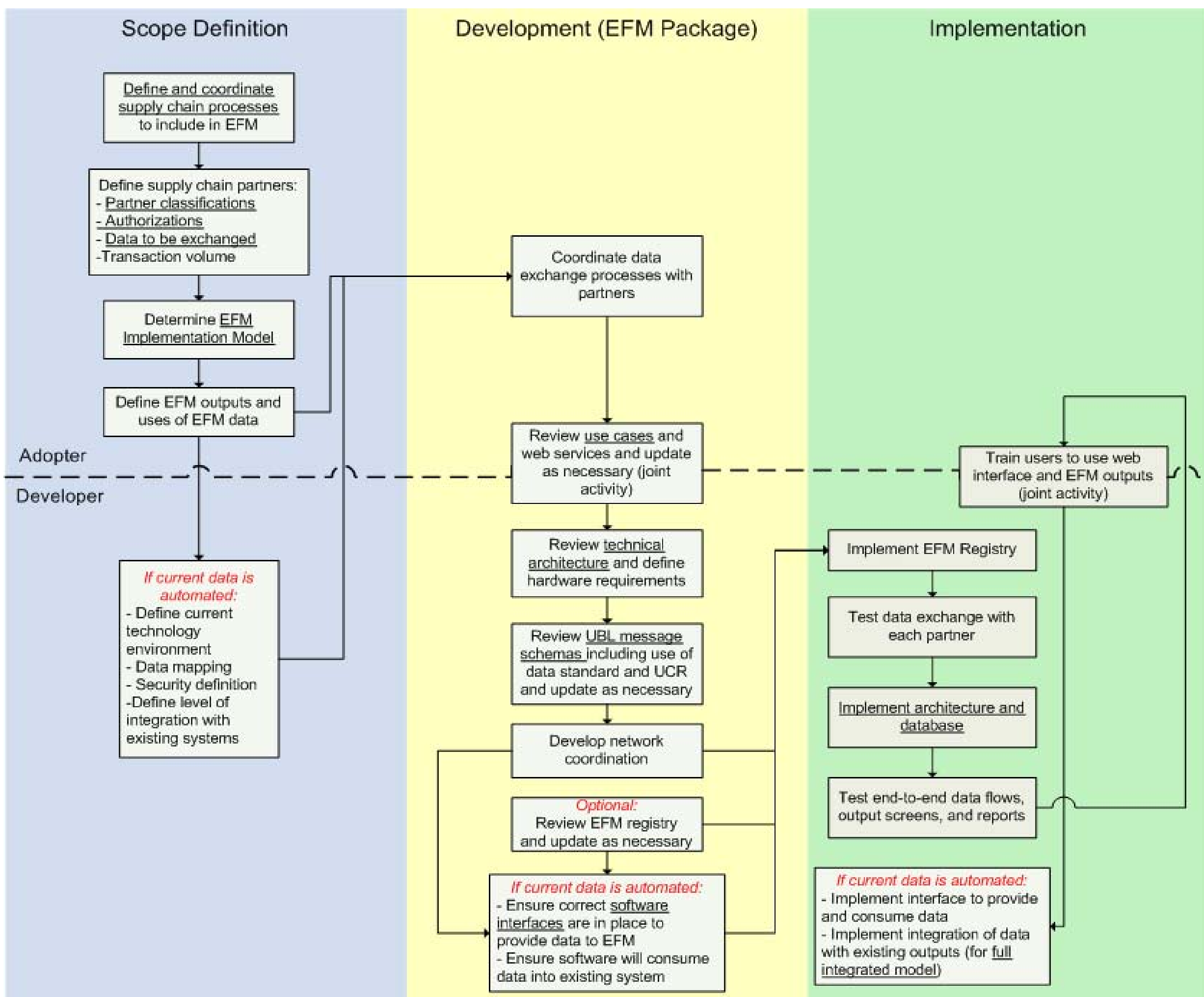


Figure: Implementation of the Electronic Freight Management (EFM) Program

Benefits
While the EFM is an initiative that is being adopted by the commercial sector, its design has been sponsored by DOT because it is an important component of DOT's mission to address efficiency, safety, security in freight transportation networks. The concept of a public-private partnership requires that benefits accrue to both parties. The nature of the EFM initiative assures that many benefits apply equally to public and private interests, while others are more specific to one party or the other. A review of the more significant benefits can be summarized as follows:

Public Sector Benefits
- The improved efficiency resulting from EFM implementation relates directly to public concerns about preserving mobility, mitigating congestion, and enhancing security.
- Mitigating Freight Congestion. Congestion results when handoffs at intermodal nodes are impeded due to delays in the transfer of information between partners. Congestion contributes to inefficiencies in the transportation network, to environmental degradation, and to increased security risks. EFM implementation promotes efficient transition of goods through the supply chain.
- Promotes Safety and Security. EFM's information sharing helps with risk mitigation strategies. For example, Customs and Border Protection (CBP) as well as the brokers with which CBP works can use EFM to improve the accuracy of the data that will be input to CBP's systems.
- Encourages open, competitive markets. EFM directly addresses the challenge that small enterprises with little or no IT investment face in participating in EDI and Value Added Network-intensive freight networks it effectively levels the playing field and creates more opportunities for smaller enterprises.
- Promotes environmental benefits. Environmental benefits accrue if transportation networks are operating more efficiently, for example with less idle dwell times for pollution-generating vehicles. Truckers will be able to schedule pickups to maximize their loads, thus improving fuel efficiency. They will be able to plan their trips to avoid idling at docks or distribution centers while waiting for late arrivals. Overall, less fuel will be consumed and fewer greenhouse gases will be emitted from tailpipes.

Private Sector Benefits
- Improves the efficiency of the physical movement of freight throughout the transportation supply chain.
- Positions organizations for emerging IT environments in which expensive value-added networks continue to be supplemented by open, Internet solutions.
- Offers cost avoidance by eliminating low-value data entry tasks and by reducing errors associated with manual operations.
- For asset-based transport providers, EFM can improve asset performance by providing better information about shipments that can help optimize resources.
- Equipped with more accurate, more timely, and near real-time data about shipments, organizations of all types can make better operating decisions that directly or indirectly affects profitability and success in the market.

- EFM readily interacts with Service Based Architecture (SOA) and creates value for the organization by:
    - Reduction of operational costs, for example by reducing the burden of integration, operation and maintenance through open industry standards
    - Increased responsiveness and agility
    - Efficiently enhancing or extending existing IT solutions (assuming EFM is integrated into existing systems), effectively increasing an organization's competitive influences
    - Creating conformity through establishment of a federated, standardized enterprise based on open technologies.

- Reduced demurrage charges to ocean carriers for containers not unloaded and returned within specified time limit.
- Reduced warehouse labor costs due to more accurate delivery date information.
- Decreased outbound shipping costs (and better customer service) due to more accurate delivery date information.
- Reduced overall inbound shipping cost through increased container utilization.
- Better capacity to access shipment information based on US CBP Entry Number.
- Reduction in effort and labor hours expended monitoring inbound shipments.
- “Anywhere-to-anywhere” supply chains require nimble connectivity solutions to permit organizations to quickly begin conducting business together EFM presents a solution to this challenge.
- Improved Supply Chain Security and Resiliency a lasting benefit of EFM is the ease with which companies can respond to changing regulatory requirements, such as the 10+2 rule. Many companies will not be able to provide the needed data on their own. EFM can help provide this visibility without sacrificing operational efficiency in the process.
- EFM provides a mechanism for sharing supply chain data that is simpler, cheaper, and more efficient than traditional EDI. It makes it easier to customize the flow of information between supply chain partners. It provides a system where data is entered once but used many times, reducing or eliminating data transcription errors. Partners are able to replace paper trails with electronic information.
- Rather than each supply chain partner having to collect and maintain large databases of shipment related information, EFM enables partners to maintain only the data they create and then share that data with other partners through a common web interface. This reduces the degree of duplicate data entry and its inherent probability of errors. It allows owners to uniquely identify each transaction for all partners based on the UCR standard developed by the WCO.
- A major benefit of EFM is that partners are provided detailed shipment data visibility without requiring them to replace or overhaul their existing information systems. EFM uses standardized data exchange processes based on the Universal Business Language (UBL). The EFM architecture is most supportive of organizations using standardized XML messaging. In a survey of industry commissioned by the DOT, the American Transportation Research Institute found that 84% of respondents use EDI but that 80% preferred receiving electronic documents in XML format. Of those not using XML, 55% anticipated converting to it within 5 years. Using UBL in XML-based documents and messages lowers integration

costs. UBL is available for use without cost and the various XML applications in EFM are available at no cost in the EFM package. UBL messages employed by EFM include:

  - Receive order consignment
  - Book service
  - Confirm booking
  - Load shipment
  - Consignment partners
  - Subscription
  - Receive status
  - Query status
  - Divert shipment
  - Request clearance (import, export, in-bond transit)
  - Receive clearance (import, export, in-bond transit)

- Many organizations devote significant clerical staff hours to acquire shipment related data that already exists in electronic format but is inaccessible to the organization. A typical international shipment may involve a dozen or more organizations that create or consume data. Too often many of the same data items that have already been created electronically must be recreated at a later point in the supply chain. The EFM solution provides a single window into this process, greatly reducing the time and labor when accomplished individually and repeatedly.

Early results from EFM implementation showed some freight forwarders realized labor savings of nearly 3 hours daily from automated preparation of reports. In other cases, advance shipment notification was available from 6 hours up to 1 day earlier than previous practice allowed using EDI. This resulted in a 10% improvement in data availability in the warehouse, improving staff planning and forecasting of workload requirements. Shipment status information was available to the broker 4 to 6 hours earlier. Automated purchase order information allowed manufacturers to reduce shipment data entry by 75%.

Prior to the development of EFM, similar "visibility" programs were largely available only as proprietary systems developed by supply chain owners for use in their specific trade practice. Such efforts were expensive solutions affordable only by larger corporate entities with the resources to absorb such costs. Companies such as Viking Logistics, Infor, Distribution Group, Lifeway, Accenture, Dow Chemical, Sunoco, and Chemlogix implemented their own solutions. The improvements in efficiency and cost reduction validated their investment throughout the supply chain.

With the availability of EFM, these benefits are now attainable by small and medium sized businesses without the major investment required to develop these systems internally. EFM presents an "off-the-shelf" solution, without cost, to any organization. Downloading the EFM web service and architecture simplifies the process. Supply chain owners will need to develop the appropriate IT interface between EFM and their existing legacy systems and provide the necessary training for their operation.

The following tables illustrate the benefits of visibility programs such as EFM:

Productivity	
Reduced Transportation Costs	♦ 20-30% improvement (Viking Logistics) ♦ 30% reduction (Infor) ♦ Reduced expediting of shipments 75% (Distribution Group) ♦ Reduced cost/parcel by 14% (Lifeway)
Reduced Administrative Costs	♦ Reduced processing effort by 8-15% (Accenture) ♦ Reduced transportation overhead 10-30% (SCD) ♦ Reduced costs of manual data capture and entry 10-15% (Dow) ♦ 20% faster response to rate evaluations (Globalink) ♦ Reduced administrative costs by 50% (Sunoco)
Improvements in Inventory and Shipping	♦ Increased shipment consolidation by 5-25% (SCD and Chemlogix) ♦ Reduced safety stock inventory by 20% (Dow) ♦ Reduced inventory levels 25-60% (Viking Logistics) ♦ Improved transportation controls and reporting by 2-5% (Chemlogix)
Service Quality	
♦ Reduction in time to resolve in transit problems by 50% (Dow) ♦ Improvements in delivery performance by 16-18% (Viking Logistics) ♦ Improved reliability of delivery time to 90% (Dow) ♦ Improved on time delivery performance from 94% to 97% (P&G) ♦ Improved cycle time by 10-50% (Distribution Group)	
Shipment Integrity	
♦ Visibility cost savings (7%) ♦ Increase in on-time deliveries (12%) ♦ Increase in access to supply chain data (50%) ♦ Increased timeliness of shipping information (30%).	

Figure: Quantified Benefits in Industry from Visibility Technologies

	Small Company (Portal model)	Mid-Sized Company (Hybrid model)	Large Company (Integrated Model)
Annual Cost Savings at $5.94/shipment	$6,000	$178,000	$594,000
Required Investment in IT (initial)	$7,000	$121,000	$162,000
Total 5-year benefits	$25,000	$730,000	$2,400,000
Total 5-year costs	$9,500	$450,000	$835,000
5-year ROI	257%	162%	292%
Average Annual ROI	51%	32%	58%

Figure: Return on Investment Estimates for Companies Using EFM Portal, Hybrid, and Integrated Models

Partner	Metric	Shipment Activity	Quantitative Benefit	Savings Per day	Savings Per Shipment
Manufacturer	Productivity	Book consignment (Chinese labor rates)	75% reduction in data entry	$27	$0.61
Forwarder	Productivity	Shipment pre-alert (Hong Kong labor). Daily status report (U.S. labor). Airline status research (U.S. labor).	65% reduction in labor for forwarder in HK. 50% reduction in labor for forwarder in Columbus.	$187	$4.61
Customs Broker	Data quality/availability	Customs processing (US labor)	18% improvement in weekly shipments processed by the Customs Broker	Not determined	
CFS	Data quality/ availability	Error research Error correction (U.S. Labor)	6% reduction in errors at warehouse or $4/error. Reduction of EDI errors and time to correct them; savings of $3/error	$40	$0.92
Shipper	Service Quality	Research of priority shipments (U.S. Labor)	$11/day saved monitoring priority shipments	$11	$0.25
Total:				**$259**	**$5.94**

Figure: EFM Pilot Program Quantified Benefits for Supply Chain Partners

Challenges

As with any change to an existing system, it is to be expected that adopting a new practice will encounter some challenges. Each prospective owner must weigh the cost and difficulty of implementation against the benefits to be realized from the change. Among the considerations that may surface are the following:

- **New program** - EFM and similar visibility technologies are relatively new in the marketplace. EFM has only recently completed its pilot programs and is in the early stages of industry acceptance and implementation. Since it does not have a long track record of performance and historical data available for analysis, some companies will be reluctant to move to a relatively “untried” system.
- **Current system works, a new one is not needed** - In considering a change, there are generally two questions to be answered about the current business model: (1) does the current system work? (2) does the current system work efficiently? In many cases, current systems have been adapted to meet requirements that are often redundant, of no practical value, unnecessarily complex, uncoordinated, inaccurate, time-consuming, and labor intensive. They work because they have been made to work as an act of business necessity. However, they do not work efficiently. The full benefit of supply chain efficiency will elude those

companies who are willing to accept the status quo rather than aggressively embrace advances in technology. Such companies run the decided risk of being at a competitive disadvantage when competitors adopt EFM and similar systems and become more efficient and more competitive.

- **Cost** - Without question, cost is always a major consideration when deciding to implement a new business practice. If the company was required to design and develop a proprietary system completely from ground zero, the costs would be substantial and likely beyond the reach of most small to medium sized businesses. To adopt EFM, however, there are no outlays to build a proprietary system as DOT has done the work for them. The system is available as an "off-the-shelf" acquisition at no cost.
- **All supply chain partners must implement together** - EFM is designed to promote a faster and more accurate flow of information between supply chain partners, easily accessed by all partners through a single communications platform. The maximum benefits of the system, therefore, require all parties to be participants.
- **Business confidentiality** - There may be reluctance by some to adopt a single window for supply chain communication out of concern for losing control of proprietary data. The fear is that competitive information will be accessed by others to the detriment of the owner. EFM, however, ensures that proprietary data shared among supply chain partners is safeguarded. The EFM platform utilizes encryption protocols to prevent unauthorized access.
- **Labor concerns -** Labor may resist adoption of new programs which they may perceive as threatening to jobs. Because EFM and similar technologies increase efficiency by eliminating redundant data formulation and entry, increasing data accuracy and flow of information, and streamlining the administrative process to accomplish a given objective. Such advances require fewer personnel resources to be devoted to these tasks.

Security

Data Security

Because the supply chain owner determines the access level for all partners, data may be protected from unauthorized disclosure. Protection of proprietary information is assured. Partners may be given access on a need-to-know basis or excluded from certain information that may be business sensitive for competitive reasons. Access may be granted on a "read-only" basis to further protect data integrity. The EFM Package includes encryption protection for all data. Further enhancement is provided by the use of digital signatures and certificates. Partners accessing the system must supply the necessary credentials as established by the owner in order to obtain the data. The design of the procedures used to extract data from the system will filter data related only to specific shipments. This filtering will serve to eliminate or disguise any business-sensitive data.

Cargo Security

A major value of EFM usage is the improvement in freight security that it confers. Inherent improvements in data reliability and availability promote security for freight that may be at risk at some point along its routing. Freight at rest is freight at risk. EFM maximizes the mobility of freight and minimizes its risk.

EFM users may extend the EFM platform to include a “chain of possession” concept of shipments throughout the supply chain. This can include biometric identification technology deployed at the points of freight handoffs, establishing a chain of accountability for each change of custody for a given shipment. This provides a secure, closed system that ensures an individual entity is responsible for a shipment at all times coupled with the ability to track the ownership of those shipments at any given time.

Operational Security

EFM’s information sharing capabilities can help with risk mitigation strategies. For example, Customs and customs brokers can use EFM to improve the accuracy of the data that will be input into targeting systems for contraband and terrorism concerns. Companies may likewise use the enhanced visibility into their supply chain to identify potential weaknesses and to develop measures to mitigate those deficiencies.

Current status

EFM is now ready for use in the marketplace. The first usage of EFM by industry supply chain owners is underway. The first foreign operator has begun implementation in South Africa. At least eight preliminary programs are being evaluated.

Results of the two major EFM pilot programs, as well as the experiences of businesses with similar proprietary visibility software programs, have been made available for review by the US DOT.

World Customs Organization (WCO) SAFE Framework of Standards

Brief Description

In June 2002, the World Customs Organization (WCO) in response to a United States recommendation, created a Joint Customs-Industry Task Force on Security and Facilitation to address increasing levels of global terrorism. The Task Force led to the creation of the High Level Strategic Group (HLSG) that completed the work in developing the SAFE Framework of Standards to Secure and Facilitate Global Trade, and in June 2005 the WCO Council adopted the SAFE Framework. Members of the WCO recognized that because of its unique authority and expertise to inspect cargo shipped in, through, and out of a country, customs should play a vital role in securing global trade.

The objective of the HLSG was to secure global trade through the establishment of cooperative arrangements between customs, trade, and other government agencies. To meet that objective the HLSG established a set of standards that provides security and facilitation at a global level to promote certainty and predictability. The Group identified the following needs:

- International Standards
- Links Security with Facilitation
- Standards to Include Clear Benefits
- Include Customs-to-Customs & Customs-to-Business Standards
- "Real-Time" Information Sharing
- To Use Intelligence and Risk-Based Controls
- To Utilize "Single Window" Concept
- To Work with other Int'l. Organizations and,
- To create Springboard for Raised Customs Profile.

The primary objective of the Framework then is to establish a set of standards that provide supply chain security and facilitation at a global level to promote certainty and predictability. The aim was to create a model of security-related guidelines and standards that WCO members are able to implement in a practical and flexible manner.

Most security-enhancing measures in the Framework have been developed based on modern Customs procedures in relevant WCO guidelines, recommendations, and instruments, especially the Revised Kyoto Convention. At the same time, those measures will facilitate the legitimate trade as well as promote Customs reform and modernization.

The WCO Framework of Standards to Secure and Facilitate Global Trade has the following core elements:

- Advanced electronic cargo information
- Implementing and conducting risk management for selecting high risk goods

- Mutual recognition of controls and authority and ability to inspect imports, exports and goods in transit
- Non-Intrusive Inspection (NII)
- Establishing Customs-to-Business partnership and promoting the implementation of an Authorized Economic Operator (AEO) Program (Supply Chain Security – Business Case)

Implementation of the SAFE Framework is one of the primary issues for the WCO and its consultative groups. Clearly member customs administrations need to increase their capacity to adopt, deploy and manage import and export systems using these standards and guidelines. A prerequisite for that successful deployment is a modern, technology based customs administration. To further that goal the members in conjunction with many of the international donor organizations developed the Columbus program for capacity building.

The Columbus Program consists of three phases.

- The 1st phase, needs assessment, is a comprehensive diagnostic needs assessment of the current situation in the Customs administration. Uses the WCO's Diagnostic Framework tool that has been acknowledged by organizations like the UN, OECD, the World Bank, IMF and others. The needs assessment diagnosis is carried out by two Capacity Building experts. During the diagnostic mission, the experts interview all concerned parties including the members of the trade community. The mission results in a diagnostic report including the current situation, gap analysis to full implementation and the suggested way forward through a number of recommendations.
- The 2nd phase, Implementation, is support for action planning, donor matchmaking, planning of pilot activities and implementation.
- The 3rd phase, Monitoring, involves monitoring of progress.

Owner & Participants

SAFE is a public–private partnership. The WCO is the lead and sponsoring organization. Participants are those customs authorities that agree to adopt the standards into their own customs processes as well as international traders and their intermediaries who use the standards.

Realistically participants in the program are all government agencies and all international traders, carriers, brokers, and their intermediaries as operators of international supply chains in the 140 plus members of the WCO who are implementing the SAFE Framework.

Functionality/ Requirements

As described above, in order to strengthen and go beyond existing customs programs and practices, WCO Members developed a regime to enhance the security and facilitation of international trade. The SAFE Framework sets forth principles and standards and presents them for adoption as a minimal threshold of what must be done by WCO Members. The objectives, principles, and requirements of the SAFE Framework are to:

- Establish standards that provide supply chain security and facilitation at a global level
- Promote certainty and predictability
- Enable integrated supply chain management for all modes of transport

- Enhance the role, functions and capabilities of Customs to meet the challenges and, opportunities of the 21st Century
- Strengthen co-operation between Customs administrations to improve their capability
- Detect high-risk consignments
- Strengthen Customs/Business co-operation
- Promote the seamless movement of goods through secure international trade supply chains.

The SAFE Framework core elements are:

- Harmonization of advance electronic cargo information requirements on inbound, outbound and transit shipments
- Each country that joins the SAFE Framework committing to employing a consistent risk management approach to address security threats
- Requiring that at the reasonable request of the receiving nation, based upon a comparable risk targeting methodology, the sending nation's Customs administration will perform an outbound inspection of high-risk containers and cargo, preferably using non-intrusive detection equipment such as large-scale X-ray machines and radiation detectors and,
- Defining the benefits that Customs will provide to businesses that meet minimal supply chain security standards and best practices.

These core elements rest on the twin pillars of Customs-to-Customs network arrangements and Customs-to-Business partnerships. The Pillars and Standards are:

TWO PILLARS	
Customs-to-Customs Pillar	**Customs-to-Business Pillar**
Consisting of 11 Standards:	**Consisting of 6 Standards:**
1. Integrated Supply Chain Management	1. Partnership
2. Cargo Inspection Authority	2. Security
3. Modern Technology in Inspection Equipment	3. Benefits
4. Risk-Management Systems	4. Technology
5. High-risk Cargo or Container	5. Communication
6. Advance Electronic Information	6. Facilitation
7. Targeting and Communication	
8. Performance Measures	
9. Security Assessments	
10. Employee Integrity	
11. Outbound Security Inspections	

Table: WCO SAFE Framework Pillars

The two-pillar strategy has many advantages. The pillars involve a set of standards that are consolidated to guarantee ease of understanding and rapid international implementation. Standard 6 of Pillar 1, Advance Electronic Information, is most relevant to information protocols, and provides that:

Benefits
In general the benefits of the SAFE Framework include:
- Providing a new and consolidated platform to enhance world trade, ensure better security against terrorism
- Increasing the contribution of Customs and trade partners to the economic and social well-being of nations and,
- Improving the ability of Customs to detect and deal with high-risk consignments and increasing efficiencies in the administration of goods, thereby expediting the clearance and release of goods.
- More specifically, implementation of the SAFE Framework benefits governments, Customs administrations, and the business community.

Government
- Enhanced security
- Increased efficiency
- Improved border control and compliance
- Revenue increase
- Trade facilitation
- Benefits from the Authorized Economic Operator (AEO) arrangement
- Capacity building eligibility

SAFE enables international trade to contribute to economic growth and development. It assists in securing trade against the threat of global terrorism while enabling Customs administrations to facilitate the movement of legitimate trade by improving and optimizing Customs operations. Optimized operations improve revenue collection and the proper application of national laws and regulations. The result supports economic and social protection, and improves the environment for foreign direct investment.

The SAFE Framework encourages the establishment of co-operative arrangements between Customs and other government agencies. There should be recognition of other already existing international standards. This will assist governments to ensure integrated border management and control. By putting the necessary measures in place, the SAFE Framework also empowers governments to expand the mandate and responsibilities of Customs administrations in this area.

Public Sector Benefits
- The SAFE Framework establishes Customs-to-Customs network arrangements to exchange timely and accurate information that will allow management of risk on a more effective basis. It enables customs administrations to improve their controls along the international trade supply chain and improve efficient allocation of customs resources take a comprehensive view of the global supply chain and create the opportunity to eliminate duplication and multiple reporting requirements and, cope with the challenges of the new international trading environment by putting the building blocks in place to undertake Customs reform and modernization.

- The SAFE Framework is structured in a flexible manner to enable Customs administrations to move at different speeds thus allowing implementation in line with unique levels of development, conditions and requirements. Under certain circumstances SAFE provides for the mutual recognition of controls.
- The SAFE Framework provides benefits to business by creating the conditions for securing and facilitating international trade. This includes encouraging and enabling buyers and sellers to move goods between countries recognizing and basing standards on modern international production and distribution models establishing the concept of Authorized Economic Operators (AEOs) that should provide faster processing of goods by customs establishing uniformity and predictability and reducing multiple and complex reporting requirements. It fosters enhanced security, uniformity and predictability, and facilitates trade.

Challenges

Securing and facilitating the movement of goods in the international trade supply chain through the WCO SAFE Framework of Standards to secure and facilitate global trade and the implementation of the Authorized Economic Operator system and mutual recognition of such systems is a high priority for the members of the WCO. The greatest challenge for adoption and implementation is the lack of capacity by both government and business to implement the business processes recommended in the SAFE Framework. Effective use of the standards requires a modern customs administration with a sound legal basis, current technology, trained officials, and effective systems.

Customs needs assistance in putting theory and awareness into action. In particular, they need to develop the business skills, such as strategic planning, contracting, information and communication technology usage, and project management, needed to change and grow. In addition, they seek assistance in sifting through the plethora of recommendations from myriad stakeholders, especially when it comes to proper sequencing of development. Customs Directors General also requires assistance in influencing their nation’s political leaders and economic operators. For many administrations, the modernization agenda is about reducing clearance times and indeed, many administrations are making progress in achieving faster cargo releases. There is not, however, adequate application of the broad spectrum of modern Customs controls needed to support a secure and facilitated approach. What needs to be further cultivated is selectivity using sound automated risk analysis and targeting, post-clearance audit to monitor systemic processing and adjust risk profiles, and anti-smuggling expertise. In summary, the following are the key trends and patterns observed during the Columbus Program needs assessment missions:

- Customs administrations have significant awareness and understanding of what needs to be achieved for modernization
- Customs administrations are well versed in the principles of the revised Kyoto Convention and SAFE Framework of Standards but need implementation assistance, especially on strategic planning, project management, political influence, marketing, equipment maintenance, and contracting.
- There needs to be a more holistic approach to Customs operations so that focus is not lost as a result of overemphasizing one role or responsibility. Thus, all Customs administrations should ensure that adequate attention is given to all responsibilities, including revenue

collection, trade facilitation, security, enforcement, social protection, and gathering reliable trade statistics.

- Misconceptions still abound that inspecting all consignments leads to higher revenue collection or better security or that inspecting few consignments is needed for trade facilitation and does not harm revenue collection, security, and enforcement. Accordingly, 100 percent or zero percent inspections are not effective controls.
- Risk analysis is generally understood but, in practice, an enhancement of risk analysis and targeting is needed to achieve a more comprehensive risk management strategy.
- There is a substantial existing computer infrastructure what is missing is optimum usage of the available functionality.
- There is a growing amount of trade consultation progress is still required for the development and implementation of authorized economic operator programs.
- Stand-alone integrity programs are common. These need to be broadened so that they are integrated into the entire modernization agenda.
- Customs administrations have taken the lead on developing integrated border management systems. Political influence needs to be better wielded to encourage other government agencies to participate more intensely in these initiatives.
- There is potential for enhancing trade facilitation. Growing trade and a healthy business environment strengthen economies and increases revenue intake. To make trade
- facilitation improvements sustainable and to improve facilitation further, it is essential to develop Customs compliance management skills and to implement modern and effective compliance and control systems.
- It is self-evident that by addressing the challenges elucidated in this document, Customs management will be strengthened and global trade will be more secure and more facilitated. Fortunately, many of the building blocks (tools, international conventions, and guidelines) are already available. To achieve the overall objective of modernization, concerted action managed appropriately is needed. In addition, while training and technical assistance is still needed and recommended under the right circumstances, it must be pursued as part of a holistic and comprehensive change management ethos.

Security

The SAFE Standards were created to increase security. Information shared between customs administration under Pillar 1 and shared between business and customs under Pillar 2 improves the ability to identify high-risk shipments in order to prevent smuggling and ensure cargo safety and security. In response to the need for a balance between 100 inspection of all imported cargo and the increased concern of terrorist activity using supply chains, members of the WCO recognized the need for more robust security set of standards for members to adopt and use. For the U.S. the SAFE Framework provided the basis for the Secure Freight and Importer Security Filing programs.

Customs officials concluded that more complete advance shipment data would produce more effective and more vigorous cargo risk assessments. This data will significantly enhance the risk assessment process by enabling customs administrations to more efficiently separate higher-risk shipments from lower-risk shipments that should be afforded more rapid release decisions. In addition, these additional data elements will enable customs to make critical decisions during and immediately after elevated alert levels when business resumption is essential to the well being and security of the economy.

By definition the purpose of the SAFE Framework is to improve security. It was created as a means to balance commercial facilitation with the need for national security. By providing standards for the exchange of information and harmonized custom processes, those countries that adopt SAFE standards will realize the benefits described above.

Current status

The SAFE Framework is not a convention. It is an instrument of the WCO to be used as a tool to implement improved supply chain security. As of January 2010, 159 WCO members have expressed their intention to implement the WCO Framework of Standards to Secure and Facilitate Global Trade. The WCO is consulting with the International Standards Organization (ISO) to determine the feasibility of creating these standards into ISO standards.

A significant requirement for the implementation of the SAFE Framework is participation in the Columbus Capacity building program. As described in the Challenges section above, adoption of the security standards requires a substantial commitment from a government in time, resources and funding.

There are 147 Members committed, 106 Members requested capacity building, 101 diagnostic missions in Phase 1, 69 Phase 2 national missions and 14 Phase 2 regional missions completed. The WCO continues to monitor progress of those countries.

Authorized Economic Operator (AEO)

Brief Description

In response to the growth of global trade and increasing threats to the security of the international movement of goods, the World Customs Organization (WCO) endorsed a strategy to secure the movement of global trade in a way that does not impede but, on the contrary, facilitates the movement of that trade. The objective was to create a model of security-related guidelines and standards that WCO members are able to implement in a practical and flexible manner. Most of the standards and guidelines were developed using modern Customs procedures (Revised Kyoto Convention) and other instruments and recommendations.

After three years of development in a joint customs–industry working group, WCO Members adopted the SAFE Framework of Standards to secure and facilitate global trade (SAFE Framework) in June 2005. A more complete description of the SAFE Framework can be found in a separate note. Briefly, the SAFE Framework sets forth principles and standards for increased security and facilitation and presents them for adoption as a minimal threshold of what should be implemented by WCO Members to foster increased security. The core elements of that Framework are:

- Harmonization of advance electronic cargo information requirements on inbound, outbound and transit shipments
- Each country that joins the SAFE Framework committing to employing a consistent risk management approach to address security threats
- Requiring that at the reasonable request of the receiving nation, based upon a comparable risk targeting methodology, the sending nation's Customs administration will perform an outbound inspection of high-risk containers and cargo, preferably using non-intrusive detection equipment such as large-scale X-ray machines and radiation detectors and
- Defining the benefits that Customs will provide to businesses that meet minimal supply chain security standards and best practices.

Various countries and customs unions have used this standard as the basis to design AEO programs that correspond to their specific trade profiles. A brief description of the specific AEO programs of the European Union, Canada, Japan and the United States can be found below. The Appendices attached provide greater detail about the programs.

European Union

"The AEO Guidelines ensure harmonized implementation of the AEO rules throughout the EU, guaranteeing the equal treatment of economic operators and transparency of the rules. Part One of the AEO guidelines explains the AEO concept based on the adopted legislation, including:

- Explanations about the different categories of AEO
- A specific section dedicated to Small and Medium sized Enterprises (SME) with guidance on how to examine the AEO requirements if the applicant is an SME.
- A section giving advice to customs authorities on how to speed up the authorization process

- Guidance for both customs authorities and trade on how to facilitate the procedure for parent/subsidiary companies
- A description of the AEO benefits with indications on the relevant AEO category and on the timeframe for the application of particular benefits
- A complete explanation on the concept of "business partners' security".
- An explanation, with concrete examples, for determining the competent Member State where the AEO application has to be submitted.
- Guidance on how to perform monitoring after an AEO certificate has been issued.
- "Part Two contains the questionnaire, providing a list of points to assist both customs authorities and AEO applicants in assessing whether or not the AEO criteria are met.

Japan
The Japanese government has developed and promoted their AEO Program in close cooperation with the business sector, aiming at ensuring security while facilitating legitimate trade. For that purpose, Japan Customs, as a main entity in the field of international trade, developed a comprehensive AEO program with a combination of programs for importers, exporters, warehouse operators, Customs brokers and logistics operators, such as forwarders and carriers, which are consistent with the "SAFE Framework" developed by the WCO.

Canada
Partners In Protection (PIP) is a Canada Border Services Agency (CBSA) program enlisting the cooperation of private industry to enhance border and trade chain security, combat organized crime and terrorism, and help detect and prevent contraband smuggling. Originally conceived in 1995, it is a voluntary program with no membership fee that aims to secure the trade chain, one partnership at a time. Industry strongly supports the PIP program and greatly values the commitment of PIP members to do their part, together with the CBSA, to secure the supply chain and facilitate legitimate trade.
June 30, 2008, a strengthened PIP program was introduced as part of its AEO implementation. It imposes minimum security requirements mandatory site validations denial, suspension, cancellation, reinstatement and appeal policies and procedures and an automated application process. These steps to strengthen the PIP program ensure that it is better aligned with international standards such as the Framework of Standards to Secure and Facilitate Global Trade (SAFE) and the Authorized Economic Operator concept of the World Customs Organization.

United States
The United States AEO program is entitled the Customs-Trade Partnership against Terrorism (C-TPAT). As described by U.S. Customs and Border Protection Agency:
"C-TPAT is a voluntary government-business initiative to build cooperative relationships that strengthen and improve overall international supply chain and U.S. border security. C-TPAT recognizes that U.S. Customs and Border Protection (CBP) can provide the highest level of cargo security only through close cooperation with the ultimate owners of the international supply chain such as importers, carriers, consolidators, licensed customs brokers, and manufacturers. Through this initiative, CBP is asking businesses to ensure the integrity of their security practices

and communicate and verify the security guidelines of their business partners within the supply chain.

CBP provides guidelines for security criteria for the various sectors of international trade. The two sets of guidelines relevant to this study are sea carriers and foreign port authorities.

Owner & Participants

The WCO is the owner and lead organization for AEO General Standards as a component of the SAFE Framework. Each country adopting those standards as the basis for its own AEO becomes the owner and participant for that country. The users are government agencies and private sector entities that apply for and obtain AEO status with each country. The private sector participants, depending on the individual country government requirements, may include manufacturers, carriers, ports, and other intermediaries that are part of the supply chain.

Functionality/ Requirements

As a component of the SAFE Framework of Standards, AEO functions as part of the core element, defining the benefits that Customs will provide to businesses that meet minimal supply chain security standards and best practices. The WCO security standards generally required to obtain AEO status are detailed in the SAFE Framework and cover the following areas:

- Demonstrated compliance with Customs requirements: requirements specified for the AEO and taken into account when Customs considers qualifications of an AEO applicant
- Satisfactory system for Management of commercial records: recognizes the importance of maintaining accurate commercial records by an AEO and their ready availability to Customs
- Financial viability: recognizes the critical role to be filled by good financial standing in allowing an AEO to fulfill its commitments under the SAFE Framework
- Consultation, Co-operation, and Communication: Establishes measures for both Customs and the AEO aimed at fostering mutually beneficial working relationships
- Education, Training and Awareness: recognizes the importance of reinforcing in employees (both Customs and the AEO) the necessity of learning proper procedures and dealing with anomalous situations
- Information Exchange, Access and Confidentiality: Provisions to secure information and to prevent its misuse or unauthorized alteration
- Cargo Security: Seeks to ensure that cargo integrity and access controls are maintained at the highest levels
- Conveyance Security: Encourages Customs and the AEO to work together to secure and maintain transport conveyances
- Premises security: Requirements to implement programs to secure buildings and to control and monitor perimeters
- Personnel security: Elements for both Customs and the AEO regarding recruitment, security checks and personnel procedures
- Trading Partner Security: Encourages the AEO to conclude contractual provisions with partners in the Supply chain to bolster their level of security commitment
- Crisis Management and Incident recovery: Encourages advance contingency planning for recovery from adverse incidents and,

- Measurement, Analysis, and Improvement. Seeks to foster consistency, security integrity and the identification of security system requirements.

With the flexibility provided in the SAFE Framework, WCO member countries applying the standards can adjust these requirements to their specific needs. The functional process for obtaining AEO status varies member country by member country. The U.S. C-TPAT Program for example has some different requirements from the EU AEO Program. The application process also varies.

While the SAFE Framework encourages mutual recognition of each other's programs, that is slow in developing. Japan and New Zealand have signed a mutual recognition agreement and Japan is in negotiations with the EU and U.S. and is studying such agreements with Australia, China, and Canada. The U.S. and EU have been in talks for several years but mutual recognition has not been achieved.

Benefits

Although the various AEO programs that have been implemented provide specific benefits to participants, they all consist of common requirements. In general, AEO is intended to create a partnership between government and international business that will benefit both by ensuring the safety and security of the international trade supply chain and by facilitating the flow of legitimate goods across borders. AEO is a voluntary program therefore, it encourages business collaboration with customs and allows for flexibility of security policies and procedures that would not be possible under a regulated program. AEO programs established under the SAFE Framework provide mutual recognition—customs in one country recognizes and provides benefits based upon a business's AEO status in another country. Common requirements, voluntary compliance, and mutual recognition are important concepts for a global economy. The impact and benefits of AEO will increase as more customs administrations recognize AEO status.

Public Sector Benefits

- For customs and other agencies with border responsibilities, AEO uniform criteria and consistent risk management guidelines facilitate mutual recognition and eliminate the need to conduct onsite validations in every country in which the AEO applicant conducts business.
- Government time and resources can be more effectively allocated to target cargo of unknown and potentially unsafe operators.

Private Sector Benefits

AEO is an optional customs certificate that grants companies preferential treatment in those customs administrations implementing the program. Customs organizations in many countries have agreed to provide AEOs prioritized cargo processing and release, reduced cargo inspections and head of the line priority use of non-intrusive inspection techniques when examination is required. Such measures will decrease cycle time, increase supply chain predictability and potentially lower storage expenses while facilitating on-time deliveries and customer satisfaction. Some programs also grant consideration of a company's AEO status when threat levels are elevated or prioritization of an AEO's exports when business is resumed at ports following an incident, which provides a competitive advantage and enhances business continuity.

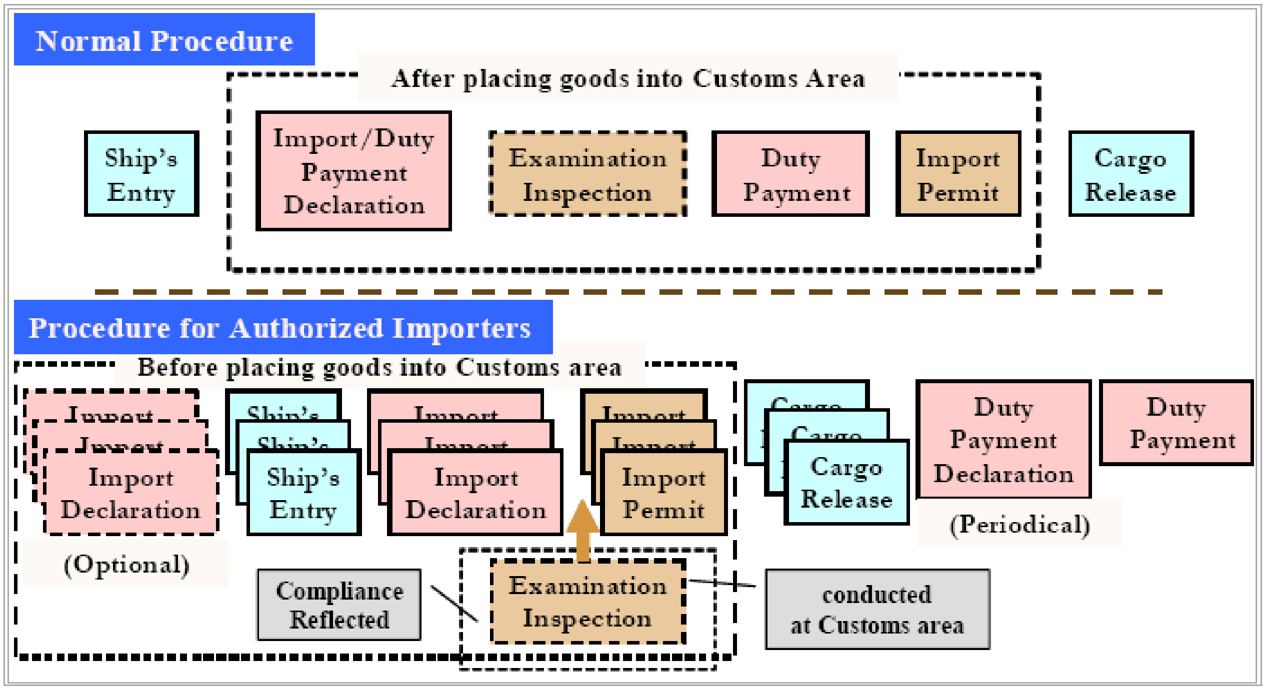


Figure: Import Declaration Business Process Comparison

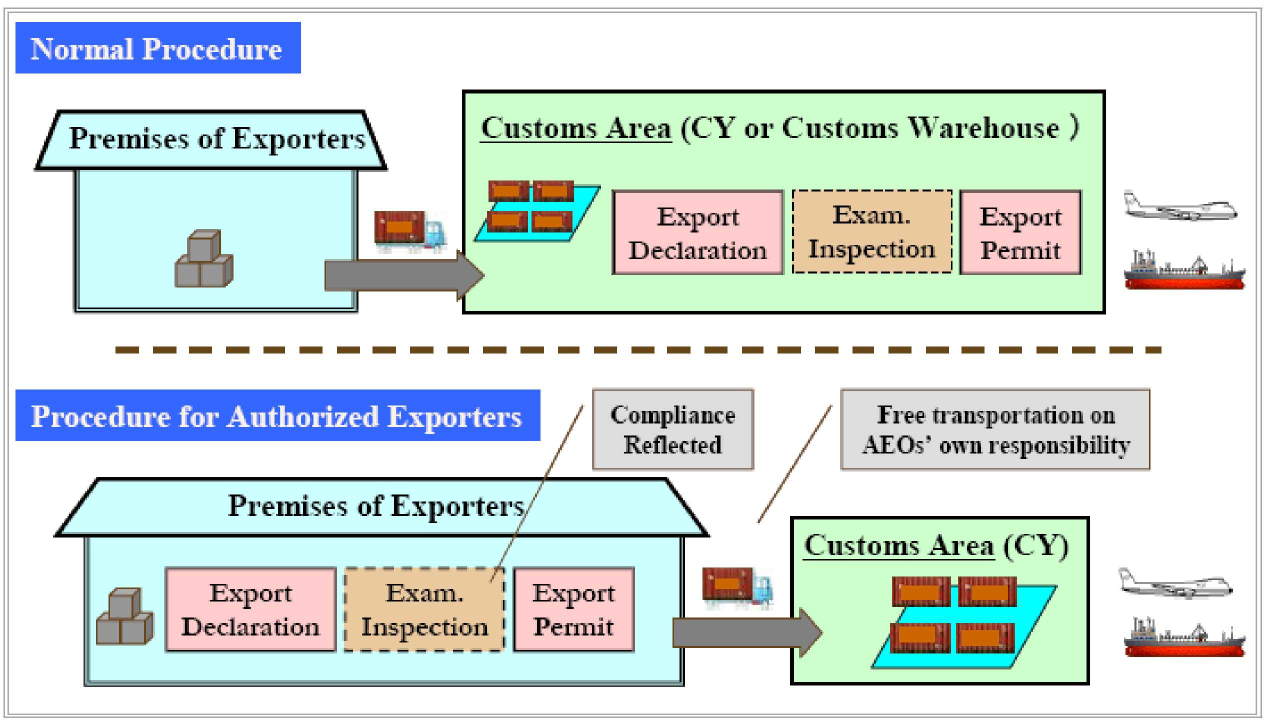


Figure: Export Declaration Business Process Comparison

Challenges
Securing and facilitating the movement of goods in the international trade supply chain through the AEO concept of the SAFE Framework of Standards to secure and facilitate global trade and mutual recognition of such systems is a high priority for the members of the WCO. The greatest challenge for adoption and implementation of these standards for government and business is the lack of capacity to implement the business processes recommended in the AEO SAFE Framework. Effective use of the standards requires a modern customs administration with a sound legal basis, current technology, trained officials, and effective systems. For business it requires greater control over the supply chain and the various entities providing goods and services to that transaction.

Customs needs assistance in putting theory and awareness into action. In particular, they need to develop the business skills, such as strategic planning, contracting, information and communication technology usage, and project management, needed to change and grow. Insufficient funding and training for personnel for managing AEO programs is frequently cited as one of the main challenges to a good AEO program

Business needs are similar although the lack of real time benefits from obtaining the AEO status is frequently cited as an impediment to investing the time and cost to be qualified. The most difficult challenge for the business community is the current lack of mutual recognition as AEO is implemented around the World. There are a few mutual recognition efforts underway but in the most part, companies have to duplicate their time and funding for each of the countries where they conduct business.

Security
The overall security of AEO is similar to the SAFE Framework Standards that were created to increase security. Information shared business and customs under Pillar 2 improves the ability to identify high-risk shipments in order to prevent smuggling and ensure cargo safety and security. In response to the need for a balance between 100 inspection of all imported cargo and the increased concern of terrorist activity using supply chains, members of the WCO recognized the need for more robust security set of standards for members to adopt and use. The objective of AEO standards is intended to improve security by engaging private traders into the need for better security in the supply chain. From manufacturing to delivery to the ultimate customer, with a commitment from traders, carriers, and their intermediaries to adopt practices to make the supply chain more secure will achieve overall improved security for the national border.

It is believed that lower risk shipments are made by lower risk companies and their intermediaries. The purpose of the SAFE Framework and its AEO element is to improve security. It was created as a means to balance commercial facilitation with the need for national security. By providing standards for the exchange of information and harmonized custom processes, those countries that adopt SAFE standards will realize the benefits described above.

Current status
As of January 2010, 159 WCO members have expressed their intention to adopt the SAFE Framework including some version of an AEO. The standards are in place, adoption and

implementation requires greater capacity from countries than they currently enjoy. To meet this challenge the WCO launched the Columbus Program, a large-scale Customs capacity building program intended to foster sustainable Customs modernization and implementation of the WCO Framework of Standards to Secure and Facilitate Global Trade, the WCO Revised Kyoto Convention, and other trade facilitation standards and best practices.

Linha Azul

Brief Description

Linha Azul or the "Blue Line" is an initiative of the Brazilian Customs and Tax Authorities to implement elements of the WCO SAFE Framework (see SAFE Framework Section). Pillar 2 of the SAFE Framework calls for government to business communication and cooperation for the benefit of improving supply chain security. The Brazilian Internal Revenue Service (SRF) is responsible for customs control for the purposes of compliance with tax laws administrative and foreign exchange and to ensure the performance of the health control, environmental and public safety. It is also responsible for the appropriate transport and storage of goods in foreign trade. Between the agencies Blue Line provides express clearance at the border for those authorized company's goods.

Companies that meet the requirements and voluntarily operate under the Blue Line regulations benefit by having their import, export and transit customs operations directed to the preferential green channel for expedited verification and processing of customs clearance.

The scheme follows the AEO process for accreditation of legitimate and reliable operators to operate in foreign trade with fewer barriers in their foreign trade transactions. (see separate report on AEO). The philosophy behind the Blue Line is seeking to maximize use of the government's limited resources to respond to the growing volume of foreign trade. SRF recognized the need for the customs administration to create a system that rewards the voluntary compliance with customs legislation and the pursuit of excellence in dealing with the public, so that Customs can release resources to be allocated to areas and operations at higher risk.

The role of SRF in customs control aims to ensure the safety and economy of Brazilian society, as well as a safe international trade, legitimate and reliable. In exercising this role, SRF recognizes that exporters and importers work with different volumes and values, as well as different patterns of information technology and security systems. Such differences are influenced by the performance of customs tax laws. The Blue Line was designed for exporters and / or importers demonstrating meet minimum operating in foreign trade, organization and reliability to the customs control.

Owner & Participants

The Brazilian tax authority SRF and Receita (customs) developed Blue Line to implement the WCO's SAFE Guidelines for the benefit of trusted company traders. Those agencies control the process and determine which companies can participate.
Current companies with Blue Line (Linha Azul) status include:

Entity	Entity
1. 3M do Brazil Ltda	18. Motorola Industrial Ltda
2. Andreas Stihl Moto Serras Ltda	19. Nissan do Brazil Automóveis Ltda.
3. BASF S/A	20. Nokia do Brazil Tecnologia Ltda

Entity	Entity
4. Caterpillar Brazil Ltda 5. Continental Brazil Indústria Automotiva Ltda 6. Cummins Brazil Ltda 7. Denso do Brazil Ltda 8. DOW Brazil Sudeste Industrial Ltda 9. Dupont do Brazil S/A 10. Dynapac Brazil Indústria e Comércio Ltda 11. Eaton Ltda 12. Embraer Empresa Brazileira de Aeronáutica S/A 13. GE Celma Ltda 14. Honda Automóveis do Brazil Ltda 15. Johnson & Johnson do Brazil Indústria e Comércio de Produtos para Saúde Ltda 16. Komatsu do Brazil Ltda 17. Maximiliano Gaidzinski SA - Indústria de Azulejos Eliane	21. Nutron Alimentos Ltda 22. Renault do Brazil S.A 23. Robert Bosch Ltda 24. Rolls Royce Brazil Ltda 25. Samsung Eletrônica da Amazônia Ltda 26. Sanmina-SCI do Brazil Integration Ltda 27. Siemens Enterprise Communications - Tecnologia da Informação e Comunicações Corporativas Ltda 28. Solvay Indupa do Brazil S/A 29. Tavex Brazil S/A 30. Tetra Pak Ltda 31. Unilever Brazil Higiene Pessoal e Limpeza Ltda 32. Volkswagen do Brazil Ltda 33. Volvo do Brazil Veículos Ltda 34. Yamaha Motor da Amazônia Ltda

By extension, those intermediaries providing service to Blue Line companies are also participants in the program.

Functionality/ Requirements
The Blue Line customs regime reduces the goods clearance time of the companies that work on foreign trade in front of the cargo movement rationalization, on the import, export and customs transit operations without compromising controls. Its functions and requirements are:
Functions:

- Reduce costs for import and export
- Reduce the time of the customs clearance process
- Simplify the treatment for cargo
- Requirements:
- Accomplish the fiscal regularities requisites providing the CND (certidão negativa de débito) Negative Debit Certificate
- Do not have any outstanding obligation with the Income Tax Organ (SRF)
- Have not been submitted to the special conference regime treated on the art. 33 of the Law nº 9.430, of 27 December 1996, in the last three years
- Maintain an industrial activity in Brazil
- Maintain accounts control with informatics
- Possess a corporate informatics system
- integrated with the accounting
- to control stock of goods
- separating the foreign goods
- goods destined for export

- that identifies those goods entering, remaining and leaving and,
- that identifies the operations realized per establishment (office)
- Be registered on the Companies National Registering List Number (CNPJ) for over 24 months
- Possess net revenue equal or higher than R$ 20.000.000, 00 (twenty million Reais), on the last day of the month before the starting of the protocol registering process
- The revenue realized, during the last fiscal year or the last twelve months before registering, with a minimum of one hundred foreign trade operations (import and export), with total values of the foreign supply chain equal or bigger than US$ 10,000,000.00 or equivalent in other currency and,
- Present an audit report assuring that the internal controls guarantee the regular accomplishment of the register obligations, documents and customs duties.
- Arrange for the settlement of any disputes with the responsible agencies or term of appointment and schedule adjustment, if any
- Prepare audit report to endorse the company's internal controls to ensure the proper performance of its obligations registration, documentary, tax and customs
- Apply with all required documents and information required to SRF for Blue Line status
- SRF has jurisdiction for enforcement of taxes on foreign trade and on the parent company of the legal applicant
- Provide a maintenance scheme
- Agree that the company will be subject to regular monitoring of compliance with tax obligations and customs
- Keep in place permanently the requirements and conditions enabling the preference and, among other audit controls, to ensure direct access and unrestricted control of their computer systems of control.
- Provide that every two years, the company should present new audits demonstrating the maintenance of the quality of their internal controls.

The prior clearance and voluntary undertakings operating on the Blue Line provide more and better controls to the extent that they undertake to demonstrate the quality of the company’s internal controls to ensure compliance with its obligations customs, tax, registration and documentation, and also prevented the permanent monitoring by the customs supervision.

The scheme not only introduces a new approach in the management of voluntary compliance with the legislation, but also a more efficient and effective Customs relationship with the exporters and importers who demonstrate their ability to provide the tax authorities with accurate and timely information and are assessed as low risk for the customs control. Advanced information assist customs in determining:
Loads subjected to treatment of "primary storage" or "charge is not for storage, depending on the unit of clearance of goods
Loads cleared for traffic, consumption or admission procedures with minimal intervention of customs supervision and on a priority basis Customs Conference held loads selected on a priority basis.

Benefits
Public Sector Benefits

- Blue Line enables international trade to contribute to economic growth and development. It assists in securing trade against the threat of global terrorism while enabling Customs administrations to facilitate the movement of legitimate trade by improving and optimizing Customs operations. Optimized operations improve revenue collection and the proper application of national laws and regulations. The result supports economic and social protection, and improves the environment for foreign direct investment.
- The Brazil SAFE Framework's Blue Line encourages the establishment of co-operative arrangements between Customs and other government agencies such as the tax and health authorities. This will assist governments to ensure integrated border management and control.
- The Blue Line establishes Customs-to-Business network arrangements to exchange timely and accurate information that will allow management of risk on a more effective basis. It enables customs administrations to improve their controls along the international trade supply chain and improve efficient allocation of customs resources take a comprehensive view of the global supply chain and create the opportunity to eliminate duplication and multiple reporting requirements and, cope with the challenges of the new international trading environment by putting the building blocks in place to undertake Customs reform and modernization.

Private Sector Benefits

- The Blue Line as an Authorized Economic Operators (AEOs) element of the SAFE Framework provides benefits to business by creating the conditions for securing and facilitating international trade. This includes encouraging and enabling buyers and sellers to move goods between countries recognizing and basing standards on modern international production and distribution models providing faster processing of goods by customs establishing uniformity and predictability and reducing multiple and complex reporting requirements.
- The Blue Line program also enhances security and safer work environment, improves Business-Client relationship, improves Customs-Business relationship, increases efficiency, and provides special border procedures, lower inspection rates, and reduced border clearance time. Streamlining customs procedures enables exporters and importers to reduce their logistics costs and inventory and, consequently, become more competitive in the global market.

Challenges

For customs and the government there are several challenges to a long-terms successful AEO program like Blue Line. Creating the eligibility criteria consistent with the international standards is difficult. Yet is there is to be mutual recognition, those criteria must be equivalent to those of the European Union, Japan, the U.S. and many others (See separate report on AEO). Consistent with other modernization programs, lack of resources both financial and human are limiting factors.

For business, the requirements for eligibility are quite restricting. The system is created for large companies. Small and medium sized companies cannot achieve Blue Line status. Even for large companies, making your accounting and inventory records open to the Brazilian tax authorities requires a serious commitment to the companies' investments in Brazil.

Only those companies with a presence in Brazil are eligible. Blue Line, while it was created as an AEO process to implement the SAFE Framework, operates as an incentive for foreign direct investment in Brazil. The system not only rewards trusted companies for their security practices, it also rewards only those companies that bring investment and jobs to Brazil. The economic requirement for investment is not a SAFE Framework standard. The challenge for Brazil is to widen the scope of the project to apply to all companies that meet the security and facilitation standards.

Even with the Blue Line the cost of customs clearance into Brazil remains a challenge for both importers and Receita. Lack of sufficient infrastructure in ports, rail and highway limit the cycle time for moving cargo to customers. Security remains a challenge. When containers and cargo are "at rest" as the saying goes, they are "at risk."

Security

Since it is based upon the standards from the WCO SAFE Framework, the Blue Line is both a security program and a commercial system. Its principal focus is security of the cargo but that includes security form theft, security to pay the appropriate duties and taxes, and security from smuggling contraband.

The SAFE Standards were created to increase security. Information shared between business and customs under Pillar 2 improves the ability to identify high-risk shipments in order to prevent smuggling and ensure cargo safety and security. In response to the need for a balance between 100 percent inspection of all imported cargo and the increased concern of terrorist activity using supply chains, members of the WCO recognized the need for a more robust security set of standards for members to adopt and use. For Brazil the SAFE Framework program is Blue Line.

Customs officials concluded that more complete advance shipment data would produce more effective and more vigorous cargo risk assessments. This data will significantly enhance the risk assessment process by enabling customs administrations to more efficiently separate higher-risk shipments from lower-risk shipments that should be afforded more rapid release decisions. In addition, these advanced data elements will enable customs to make critical decisions during and immediately after elevated alert levels when business resumption is essential to the well being and security of the economy.

Current status

Blue Line is live and deployed in the Port of Santos. There are 34 companies currently authorized to use the Blue Line with the first companies being register in early 2005. As described about the universe of eligible companies is limited by the requirements of size of operations, location of those operations, and the volume of trade. Nevertheless it is an excellent example of a risk management process at work.

By creating the Blue Line the Brazilian government authorities have moved these companies and their high volume of trade to the low risk category which allows the scarce resources to be allocated to inspecting high risk shipments. It seems the experience of the 34 companies demonstrates the feasibility and effectiveness of Blue Line. No plans have been announced for further enhancements but as trade volumes continue to increase, there should be more companies in the program.

2.1.2 Port Logistics Chain Baseline

The goal in Phase 1 is to fully understand the current processes in effect in Brazil's ports. This required the Unisys Team to analyze all relevant information related to logistics operations, within the scope of the project. Understanding it is not possible to map every supply chain, emphasis was placed on mapping representative supply chains, specifically the supply chains of:

1. Mineração Curimbaba focused on the export of cargo from Brazil
2. BASF S.A. focused on the import of containerized cargo into Brazil
3. Log-In focused on the movement of cabotage cargo, domestically within Brazil.

This initial review was followed by development of baselines for business process, documentation and information flows for the port logistics chains. High level information of each of these logistics chains is documented below.

Representative Export Logistics Chain

For the purposes of this project, the Unisys Team analyzed the export logistics chain of Mineração Curimbaba, a large Brazilian mineral exporter. One of the largest in the world in its field of activity, Mineração Curimbaba has integrated its operations by the blending and processing of raw materials in a single industrial facility. In addition to a strong presence in the Brazilian market in segments such as special products for the petrochemical industry, solder for welding, jet-blasting, ceramics, refractory materials, clarification of mineral oils, smelting and agrochemicals, Mineração Curimbaba trades about 65% of its production abroad, especially in Latin America, North America, Europe and Asia.

At Mineração Curimbaba, bauxite is the raw material for a diversified series of products for the segments mentioned above. Currently, the company is constituted by two units in Poços de Caldas: Ponte Preta and Campo do Meio. For the purposes of the ICNCP project, the Unisys Team collaborated with the team from Mineração Curimbaba, in analyzing the logistics chain consisting of the export of 20ft dry containers (TEU's) stuffed with big bags of bauxite from Santos, Brazil to the Port of Houston in the US. The table below highlights some of the high level details of the Mineração Curimbaba export logistics chain.

Representative Import Logistics Chain

For the purposes of this project, the Unisys Team analyzed the import logistics chain of BASF S.A, the Brazilian business unit of BASF. BASF is a German chemical company and the largest chemical company in the world. The BASF group comprises of more than 160 subsidiaries and joint ventures and operates more than 150 production sites in Europe, Asia, Australia, Americas and Africa. BASF S.A. headquartered in Sao Paulo, Brazil employs over 15,000 personnel and its portfolio includes products such as chemicals, plastics, polyurethanes, agricultural products, and fine chemicals.

For the purposes of the ICNCP project, the Unisys Team collaborated with the team from BASF S.A., in analyzing the logistics chain consisting of the import of 20ft dry containers (TEU's) stuffed with palettes of Glacial Acrylic Acid from the Port of Philadelphia in the US to the Port of Santos, Brazil. The table below highlights some of the high level details of the BASF S.A. logistics chain.

Representative Cabotage Logistics Chain

For the purposes of this project, the Unisys Team analyzed the cabotage logistics chain of Log-In Logistica. Log-In is only logistics company in Brazil that offers its clients integrated solutions for port handling and door to door container freight forwarding by sea or rail, supplemented by road links. With more than 750 employees located 13 offices in Brazil and in Argentina, Log-In operates seven vessels dedicated to coastal shipping, and they manage and operate a container port terminal, the Terminal de Vila Velha (TVV), in the Brazilian state of Espírito Santo. They also provide cargo storage services in their inland intermodal terminals and have experience in planning, managing and running logistics projects for their customers.

For the purposes of the ICNCP project, the Unisys Team collaborated with the team from Log-In, in analyzing the cabotage logistics chain consisting of the cabotage domestic movement (in and out) of containerized cargo to and from the Port of Vitória, Brazil.

Export Logistics Chain

This section provides a description of the major processes and security findings of the Export Logistics Chain from a control point perspective. The Unisys Team analyzed a supply chain for exporting cargo from Brazil and has documented the As-Is Logistics Baseline into the following Six (6) discreet business processes / control points:

1. Container Demand
2. Empty Container and Cargo Movement
3. Container Stuffing
4. Container Inland Transportation
5. Terminal Operations
6. Vessel Movement

Due to the nature of the export logistics chain, each discreet process involved at least two business partners. As a result, Unisys organized the export logistics chain into six discreet processes mentioned above. This organization enabled Unisys to view and assess the export logistics chain from an individual logistics chain partner and business process/ information/ documentation or control point perspective.

A high level overview of the sequence of export logistics chain is shown below.

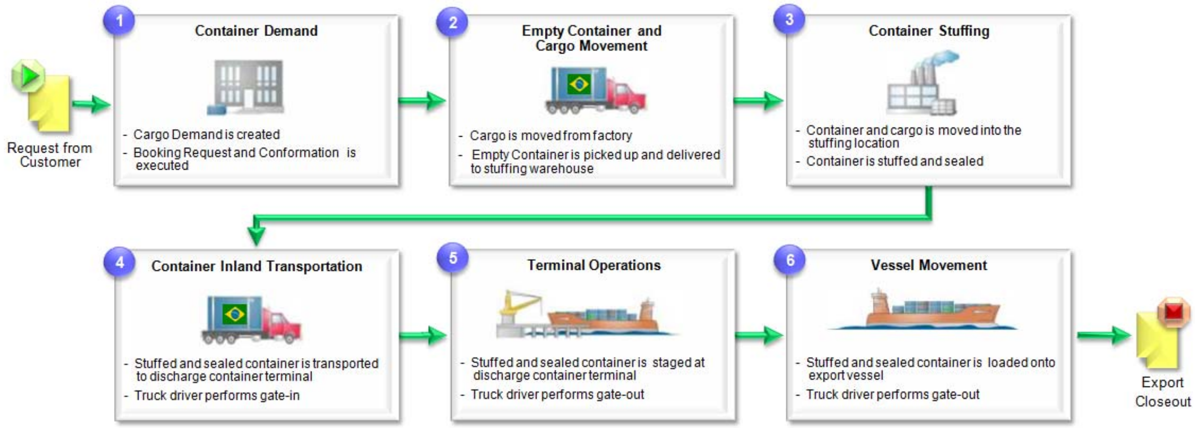


Figure: ICNCP Export Logistics Chain Overview

Additional detail of each of these control points is documented in the section below

Preceding Processes

The logistics chain business processes listed above and described in detail below are preceded by the strategic and demand planning exercise that determines the quantity of cargo to be shipped to United States. By having determined cargo volume for export, the Container Shipping Line is contracted by way of the commercial agreements and the container demand process is initiated.

Container Demand

Description

Container Demand process initiates the cargo movement activities for an export logistics chain involving the exportation of containerized cargo from the Port of Santos, Brazil. Within the scope of the ICNCP project, it serves as the starting control point of the As-Is Baseline activities.

For the purposes of the ICNCP project, the Container Demand control point will:

- **Start** with the booking request made by shipper/ exporter with the Container Shipping Line
- **End** with the receipt of the booking confirmation and delivery of shipping instructions from shipper/exporter to all relevant entities

Business Process Flow

Illustrated below is the Container Demand business process flow.

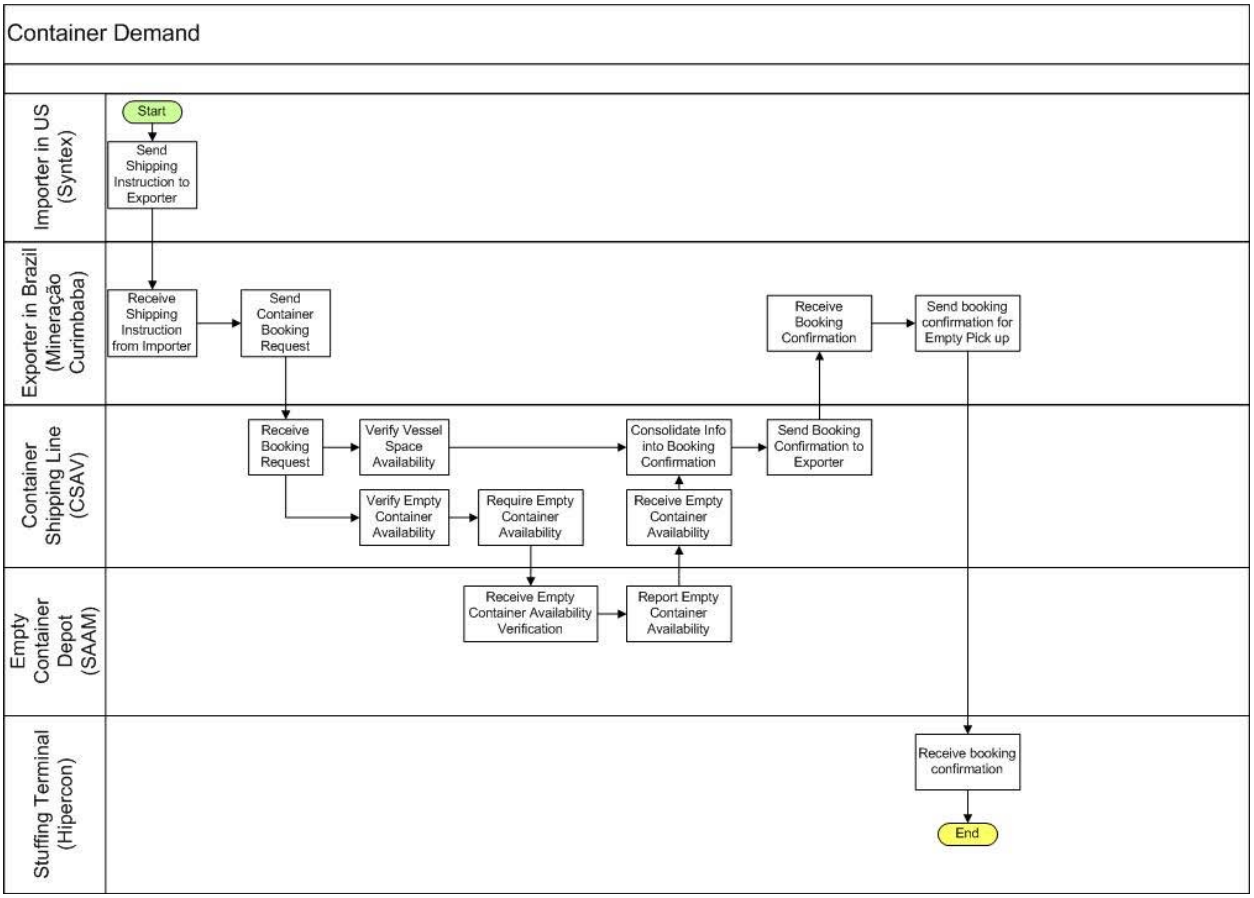


Figure: Container Demand Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Demand control point for the export of containerized cargo from Brazil:

#	Name	System	Format	From	To
1.	Shipping Instruction	Email system	Email	US Importer	Shipper/ Exporter
2.	Booking Request	• Container Shipping Line website/ Internet portal • Phone system • Email system	• EDI • Phone • Email	Shipper/ Exporter	Container Shipping Line
3.	Booking Confirmation	• Container Shipping Line website/ Internet portal • Phone system • Email system	• EDI • Phone • Email	Container Shipping Line	Shipper/ Exporter
			• Phone • Email	Shipper/ Exporter	Trucking Company

#	Name	System	Format	From	To
4.	Empty Container Fleet Allocation	• Container Shipping Line website/ Internet portal • Email system	• EDI • Email	Container Shipping Line	Empty Container Terminal/ Depot

Table: Container demand transactions and information exchange

Documentation flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Demand control point for the export of containerized cargo from Brazil:

#	Name	From	To
1.	Shipping Instruction	US Importer	Shipper/ Exporter
2.	Booking Request	Shipper/ Exporter	Container Shipping Line
3.	Booking Confirmation	Shipper/ Exporter	• Trucking Company • Container Stuffing Location
4.	Empty Container Fleet Allocation Report	Container Shipping Line	Empty Container Terminal/ Depot

Table: Container demand documents

Security Assessment
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Demand control point for the export of containerized cargo from Brazil:

<table>
<tr><th colspan="2">Area of Focus – Physical Security</th></tr>
<tr><th>#</th><th>Description</th></tr>
<tr><td>1.</td><td>Hard copy of Shipping Instructions are not controlled and multiple parties have access to the information</td></tr>
<tr><td>2.</td><td>Booking Confirmation information is printed out and access to such information is not always controlled</td></tr>
<tr><th colspan="2">Area of Focus – Policies and Procedures</th></tr>
<tr><th>#</th><th>Description</th></tr>
<tr><td>1.</td><td>Booking request is performed via a telephone call and is not authenticated (other than existing personal relationships)</td></tr>
</table>

Area of Focus – Physical Security	
#	**Description**
2.	Containers can be booked within the deadline period, especially in the cases of large export logistics chains
Area of Focus – IT Security	
#	**Description**
1.	Email and electronic communication is not encrypted by way of authentication certificates
Area of Focus – Personnel Security	
#	**Description**
1.	Container Shipping Line personnel do not have a challenge response procedure to verify identity
2.	Username and password is required to access Container Shipping Line website/ portals

Table: Container demand security observations

Empty Container and Cargo Movement

Description

Empty Container and Cargo Movement is the process involving the inland transport of the:

- Empty export containers from the empty container depot to the stuffing location
- Cargo from the manufacturing facility to the container stuffing location.

For the purposes of the ICNCP project, the Empty Container control point will:

- **Start** with empty container request from the Container Shipping Line
- **End** with the delivery of the empty container to the stuffing warehouse.

Cargo Movement control point will:

- **Start** with exporter's cargo shipping request from production site to the container stuffing warehouse
- **End** with cargo delivered at container stuffing warehouse for export.

Business Process Flow

Illustrated below is the Empty Container Movement business process flow.

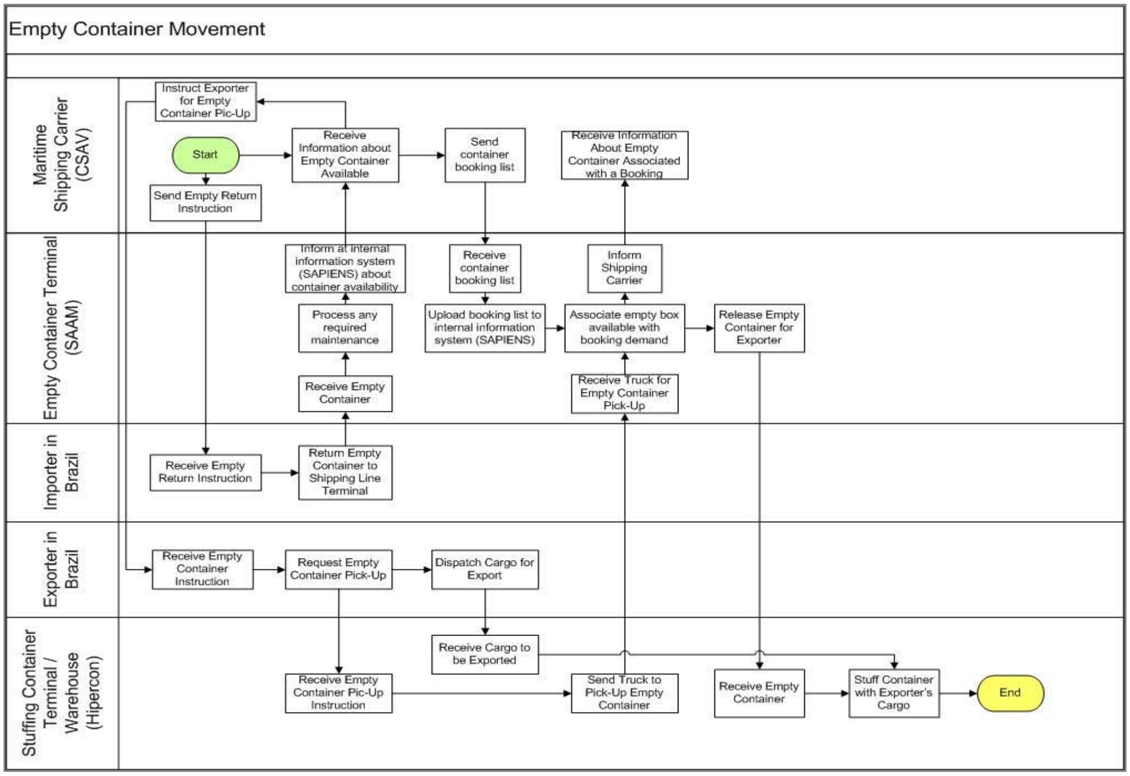


Figure: Empty Container Movement Business Process Flow

Illustrated below is the Cargo Movement business process flow.

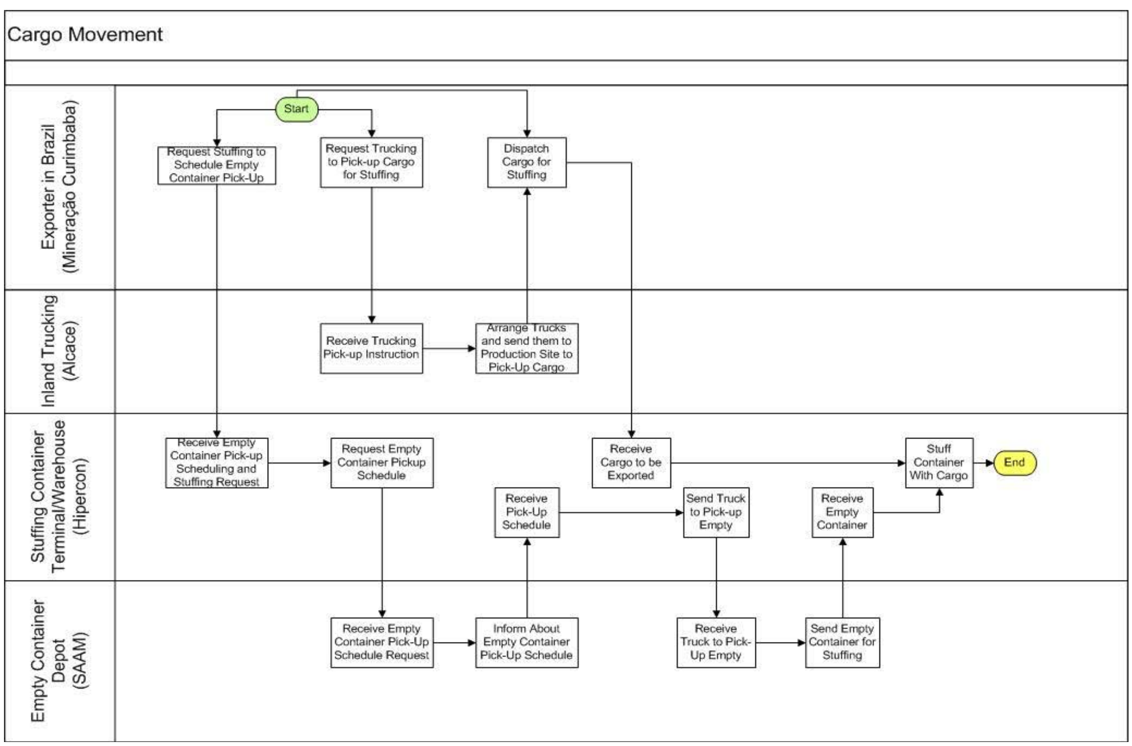


Figure: Cargo Movement Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Empty Container and Cargo Movement control point for the export of containerized cargo from Brazil:

#	Name	System	Format	From	To
1.	Booking Confirmation	• Email system	• EDI • Email	Container Shipping Line	Empty Container Depot
2.	Empty Container Availability	• Email system	• EDI • Email	Empty Container Depot	Container Shipping Line

Table: Empty Container and Cargo Movement transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Empty Container and Cargo Movement control point for the export of containerized cargo from Brazil:

Empty Container Movement

#	Name	From	To
1.	Container List (Relação de Conteineres)	Empty Depot	Container Shipping Line
2.	Booking Confirmation (Confirmação de Reserva)	Container Shipping Line	Empty Depot
3.	Equipment Interchange Receipt (EIR)	Empty Depot	Trucking Company

Table: Empty Container Movement documents

Cargo Movement

#	Name	From	To
1.	Proforma Invoice	Exporter	Trucking Company
2.	Booking Request	Exporter	Container Shipping Line
3.	Booking Confirmation	Container Shipping Line	Exporter
4.	Cargo Fiscal Bill (Nota Fiscal da Carga)	Exporter	Trucking Company

#	Name	From	To
5.	CTRC – Conhecimento de Transporte Rodoviário de Carga (Cargo Inland Bill)	Trucking Company	Receita Federal
6.	Nota Fiscal de Transporte (Transport Fiscal Bill)	Trucking Company	Receita Federal

Table: Cargo Movement documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Empty Container and Cargo Movement control point for the export of containerized cargo from Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Empty containers are regularly picked up and stored overnight at the truck driver's personal residence
2.	Steamship line seals are in the possession of the driver from two (2) to 18 hours
3.	Containers are inspected for holes, smell and discoloration, but not for identification of container modifications such as modified compartments false backs, false bottoms, hollowed beams, etc.
Area of Focus – Policies and Procedures	
#	**Description**
1.	Empty container and seal information is not consistently delivered by the Trucking Company to the Shipper/ Exporter
2.	Driver, empty container and seal information is not always delivered to the Container Stuffing location prior to stuffing
3.	Empty Containers are not sealed utilizing a standardized process across all Container Shipping Lines
Area of Focus – IT Security	
#	**Description**
1.	The Shipping Instruction email from Shipper/ Exporter to the Trucking Company and the Stuffing Location is not encrypted and not verified
2.	Trucks are tracked by GPS technology while in transit from Exporter Production site until Stuffing Terminal/Warehouse facility
3.	Empty Container Terminal is monitored by closed circuit camera system
Area of Focus – Personnel Security	

#	Description
1.	Container Shipping Line personnel do not have a challenge response procedure to verify identity
2.	Username and password is required to access Container Shipping Line website/ portals

Table: Empty Container and Cargo Movement security observations

Container Stuffing

Description

Container Stuffing is the process involving the checking, stuffing and sealing of dry containers for export with cargo at the container stuffing location in Santos, Brazil.

For the purposes of the ICNCP project pilot the Container Stuffing control point will:

- **Start** with the check in of the truck drivers at the Hipercon container stuffing location
- **End** with the check out of the stuffed and sealed container from the container stuffing location

Business Process Flow

Illustrated below is the Container Stuffing business process flow.

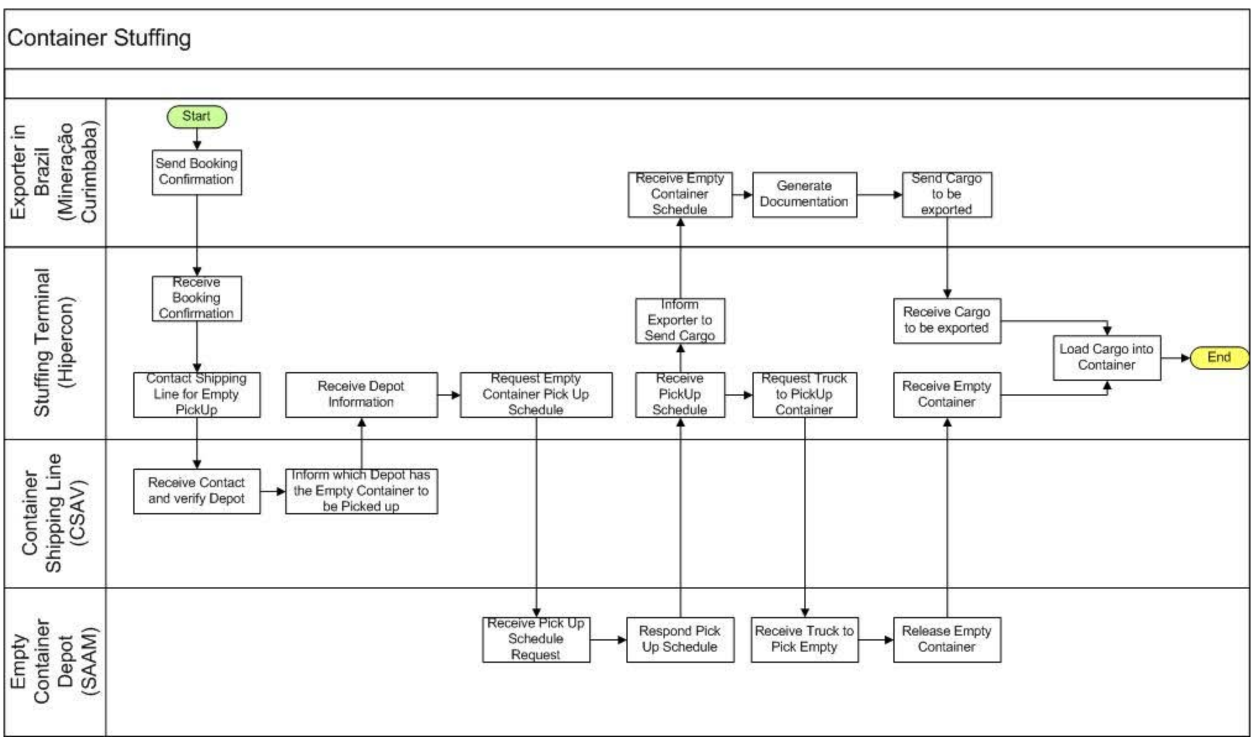


Figure: Container Stuffing Business Process Flow

Information Flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Stuffing control point for the export of containerized cargo from Brazil:

#	Name	System	Format	From	To
1.	Shipping Instruction	Email	Email	Shipper/ Exporter	Container Stuffing Location
2.	Determination	Telephone/ Email	Call/Email	Terminal/ Warehouse	Empty Container Terminal
3.	Confirmation/ Scheduling	Email	Email	Terminal/ Warehouse	Empty Container Terminal
4.	Request Cargo (Only Stuffing Terminal).	Telephone/ Email	Call/ Email	Terminal	Export

Table: Container Stuffing transactions and information exchange

Documentation flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Stuffing control point for the export of containerized cargo from Brazil:

#	Name	From	To
1.	Request Empty Container	Container Shipping Line	Empty Container Terminal
2.	RIC (Relatório de Intercâmbio de Conteiner).	Depot/ Empty Terminal	Container Stuffing Location
3.	CTRC (Conhecimento de Transporte Rodoviário de Carga)	Stuffing Terminal	Container Shipping Line
4.	SD (Situação de Despacho), (Only Stuffing terminal).	Exporter	Container Stuffing Location

Table: Container Stuffing documents

Security Assessment
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Stuffing control point for the export of containerized cargo from Brazil:

Area of Focus – Physical Security	
#	Description
1.	Stuffing process is conducted in a facility with limited perimeter security
2.	Container is sealed with the steamship line's low quality plug seal mentioned in the preceding control point
3.	Entries and key areas are supervised by armed guards
Area of Focus – Policies and Procedures	
#	Description
1.	Cargo contents are randomly selected for test and inspected for damage and bag marks but not for contraband materials
2.	Container Stuffing location does not weights empty container at gate-in
Area of Focus – IT Security	
#	Description
1.	All secure areas of the Container Stuffing location have CCTV coverage
Area of Focus – Personnel Security	
#	Description
1.	There is no standardized access control system at the Container Stuffing location

Table: Container Stuffing security observations

Container Inland Transportation

Description
Container Inland Transportation is the process involving the transportation of stuffed and sealed export containers from the Container Stuffing location in Santos, Brazil to the Container Discharge Terminal at the Port of Santos.

For the purposes of the ICNCP project, the Container Inland Transportation control point will:

- **Start** with the check out of the truck driver with the stuffed and sealed container from the Container Stuffing location.
- **End** with the check in of the truck driver at the gate-in at the Container Discharge Terminal and validation of the Delivery and Load form information with the booking information by the terminal personnel.

Business Process Flow

Illustrated below is the Container Inland Transportation business process flow.

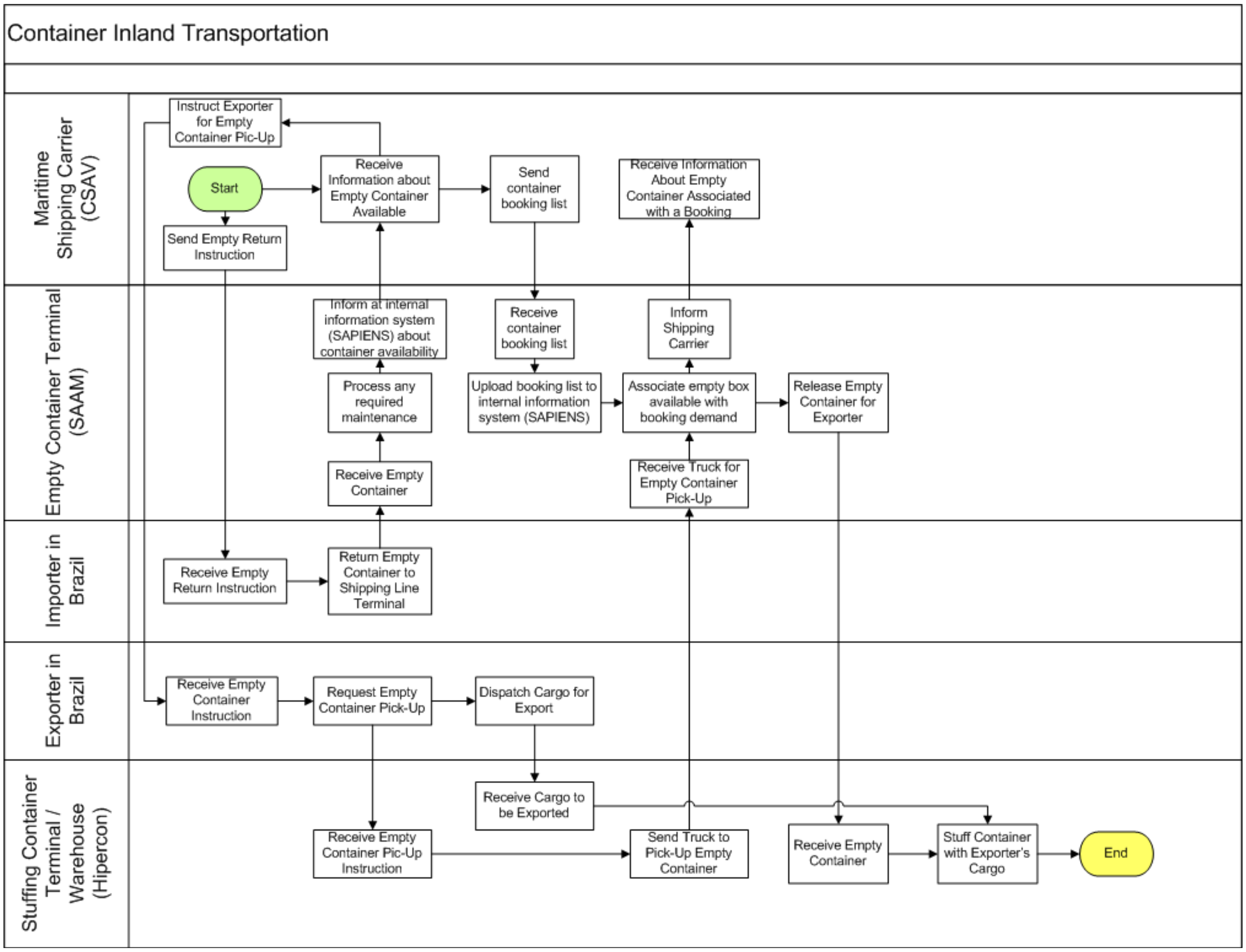


Figure: Container Inland Transportation Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Inland Transportation control point for the export of containerized cargo from Brazil:

#	Name	System	Format	From	To
1.	Booking Confirmation information	Container Shipping Line planning system	EDI	Container Shipping Line	Container Discharge Terminal
2.	Container check in and booking information validation	Container Discharge Terminal – Operating/ Management System		Container Discharge Terminal	Truck Driver

#	Name	System	Format	From	To
3.	Cargo transportation status	Two-way radio system	Verbal	Truck Driver	Trucking Company

Table: Container Inland Transportation transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Inland Transportation control point for the export of containerized cargo from Brazil:

#	Name	From	To
1.	Signed Delivery and Load form	Trucking Company	Container Stuffing location

Table: Container Inland Transportation documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Inland Transportation control point for the export of containerized cargo from Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Drivers are instructed to continue without stop to the port facilities, however check-in at the port facility can be delayed due to in-transit and gate-in traffic significantly altering travel times
2.	Trucks transporting the stuffed and sealed container have GPS units and are tracked on a real-time basis.
Area of Focus – Policies and Procedures	
#	**Description**
1.	Containers are weighed upon entering the Container Discharge Terminal. However, due to the nature of cargo, weights naturally vary due to environmental reasons by as much as 1%. Contraband can be inserted into a container with a weight impact that is less than this allowable weight variance
2.	Although GPS technology is used to track the truck cab, no standardized process exists in case of an occurrence of an anomaly such as a breakdown or deviation from the existing delivery route
Area of Focus – IT Security	
#	**Description**

Area of Focus – Physical Security	
#	Description
1.	Information recorded by the Container Stuffing location is shared with other logistics chain partners without any encryption
2.	The GPS units are not always secured to prevent tampering with them
Area of Focus – Personnel Security	
#	**Description**
1.	A large percent of the truck drivers are sub-contracted personnel, who have not gone through a thorough background check
2.	Information on the validity of personnel credentials is not checked consistently

Table: Container Inland Transportation security observations

Terminal Operations

Description

Terminal Operations is the process involving the staging and stacking of the stuffed and sealed export containers at the Container Discharge Terminal at the Port of Santos and the loading of the container on to an outbound export vessel.

For the purposes of the ICNCP project, the Terminal Operations control point will:

- **Start** with the truck driver leaving the first gate and checking in at the second gate within the Container Discharge Terminal facilities.
- **End** with the loading of the sealed container on the Container Shipping Line vessel at the terminal facility followed by the receipt of the revised Original Bill of Lading by Shipper/ Exporter from the Container Shipping Line.

Business Process Flow

Illustrated below is the Terminal Operations business process flow.

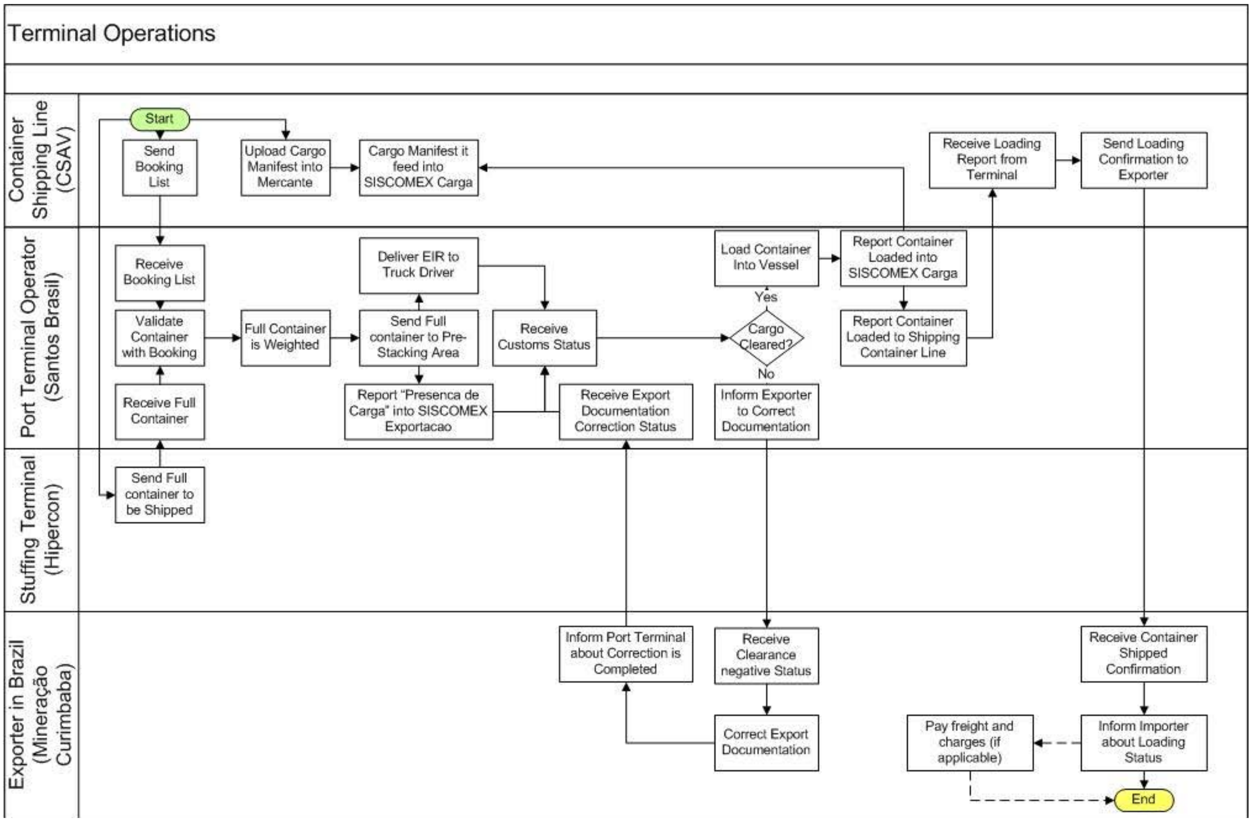


Figure: Terminal Operations Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Terminal Operations control point for the export of containerized cargo from Brasil:

#	Name	System	Format	From	To
1.	Booking Confirmation	• Container Shipping Line system • Email • Phone	• XML • Email • Phone	Shipper/ Exporter	Container Shipping Line
2.	Booking Confirmation	Container Shipping Line system	EDI	Container Shipping Line	Container Discharge Terminal
3.	DRAFT Bill of Lading SD (Situação de Despacho)	Container Shipping Line system with SISCOMEX Export	Print	Container Discharge Terminal	Shipper/ Exporter
			Web Site/ Printed	Shipper/ Exporter	Container Stuffing Location

#	Name	System	Format	From	To
4.	FINAL Bill of Lading	Container Shipping Line system	Print	Container Shipping Line	Shipper/ Exporter
5.	CE (Conhecimento Eletrônico)	Mercante	Web Site	Container Shipping Line	ANTAQ
6.	DE (Declaração de Exportação)	SISCOMEX Export	Stand Alone/ Web Site	Container Stuffing Location	Receita Federal do Brasil.

Table: Terminal Operations transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Terminal Operations control point for the export of containerized cargo from Brazil:

#	Name	From	To
1.	Container Drop-off Scheduling ticket	Truck Driver	Container Discharge Terminal
2.	Minuta (CTRC – Conhecimento de Transporte Rodoviário de Carga)	Truck Driver	Container Discharge Terminal
3.	Customs Release Notice	Container Stuffing Location	Container Discharge Terminal
4.	Bill of Lading Instruction	Container Stuffing Location	Shipper/ Exporter
5.	Revised Bill of Lading (Final/ Original)	Container Stuffing Location / Shipper/ Exporter	Container Shipping Line

Table: Terminal Operations documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Terminal Operations control point for the export of containerized cargo from Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	The export container dwells at the terminal from between seven (7) to ten (10) days. During this dwell time the container could be: • Breached and illicit material inserted into the container • Switched or replaced at the dockside staging area

Area of Focus – Physical Security	
#	**Description**
2.	Containers are only weighed when requested by the commercial customer, hence there is possibility of the presence of contraband within the shipment
3.	In some cases, Gate-in processes are conducted on a semi-public road
4.	There are armed security personnel at all personnel and cargo entry points
Area of Focus – Policies and Procedures	
#	**Description**
1.	Standardized entry procedures and not in place, where not only the identity of the person entering the secure facility is checked, but also the authentication of the credential
2.	Challenge/ response procedures in the secure areas were not found
Area of Focus – IT Security	
#	**Description**
1.	Electronic communications between Container Shipping Line and Container Discharge Terminal are not encrypted and could be modified
2.	Bill of Lading instructions or shipment status modification are not encrypted and may allow changes to container number, plug seal number, etc.
Area of Focus – Personnel Security	
#	**Description**
1.	Replacement IDs/ credentials could be used to enter the facilities

Table: Terminal Operations security observations

Vessel Movement

Description

Vessel Movement is the process involving the export of stuffed and sealed dry containers with cargo from Port of Santos, Brazil. With the exception of shipment tracking and steamship status monitoring, this control point has not been included in the scope and is not addressed by the As-Is Baseline Analysis.

For the purposes of the ICNCP project, the Vessel Movement control point will:

- **Start** with the arrival of the vessel at Port of Santos for the loading of export containers
- **End** with the departure of the vessel from the Port of Santos

Business Process Flow

Illustrated below is the Vessel Movement business process flow.

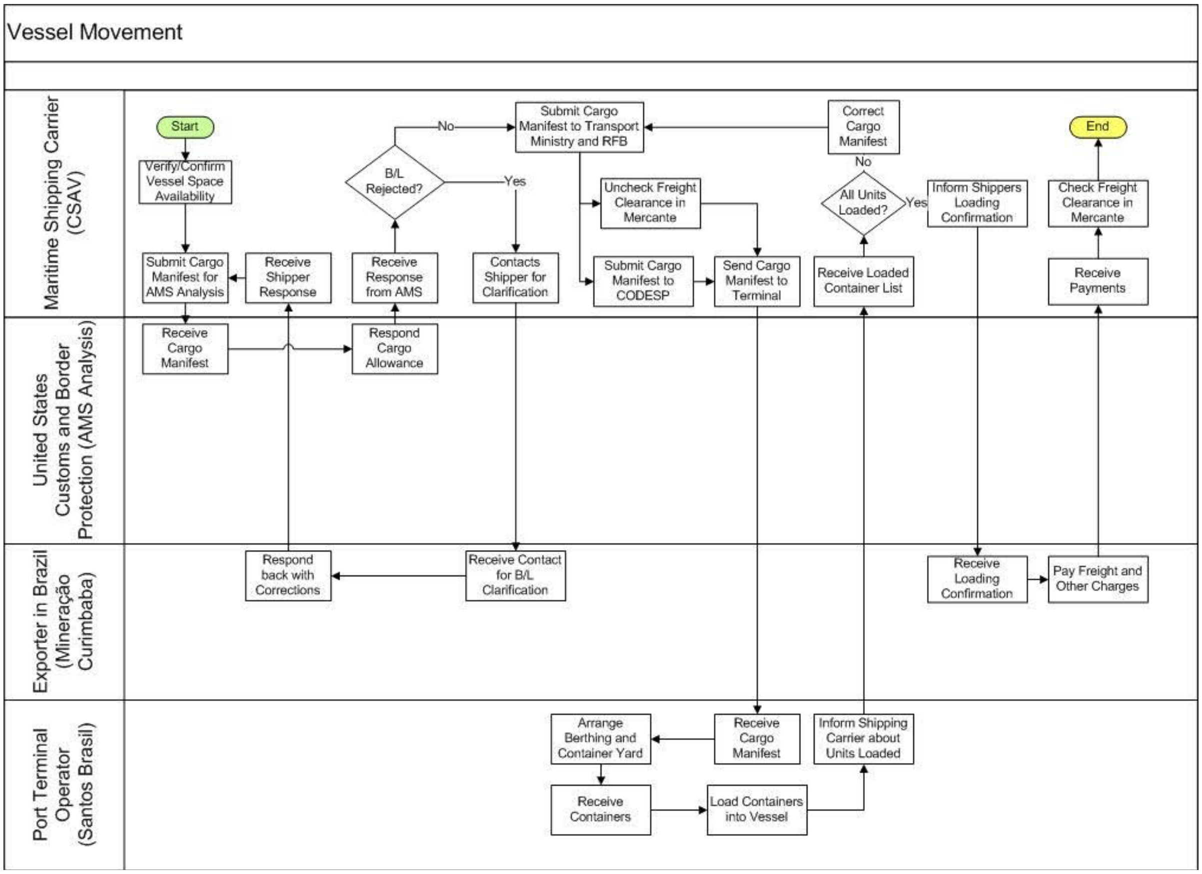


Figure: Vessel Movement Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Vessel Movement control point for the export of containerized cargo from Brazil:

#	Name	System	Format	From	To
1.	Berthing Request	SUPERVIA de Dados	TXT	Container Shipping Line	CODESP
2.	Transport Ministry Outbound Report	Mercante	Manual data entry (vessel, voyage and port of call creation)	Container Shipping Line	Transport Ministry

#	Name	System	Format	From	To
			Txt (cargo manifest upload)	Container Shipping Line	Transport Ministry
3.	Customs and Treasury Report	SISCOMEX Carga	Cargo Manifest, Electronic Bills of Lading Number and freight payment status is reflected into SISCOMEX Carga from Mercante	Transport Ministry	Receita Federal do Brasil
4.	Internal Vessel Space Control and Cargo-Freight Manifest System	Vessel Control System	TXT/ CSV	Container Shipping Line	Container Shipping Line
5.	AMS (Automated Manifest System) – USCBP (United States Customs and Border Protection)	AMS	EDI	Container Shipping Line	US CBP

Table: Vessel Movement transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Vessel Movement control point for the export of containerized cargo from Brazil:

#	Name	From	To
1.	RAP (Requisição de Atracação e Prioridade – Vessel Berth and Priority Request)	Container Shipping Line	CODESP (Cia. Docas do Estado de São Paulo)
2.	Cargo Manifest	Container Shipping Line	US CBP
			Brazilian Transport Ministry

#	Name	From	To
			Receita Federal do Brasil

Table: Vessel Movement documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Vessel Movement control point for the export of containerized cargo from Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Areas around the vessel are not secured
2.	Ship chandlers and other un-credentialized personnel have varying levels of access to vessels while they are berthed in subsequent ports of call
Area of Focus – IT Security	
#	**Description**
1.	The carrier sends a status message with vessel status information but container status information is not received by the Shipper/ Exporter in order to process the cargo
Area of Focus – Personnel Security	
#	**Description**
1.	Entry on the vessel requires ID or credential issued and cleared in advance of access

Table: Vessel Movement security observations

Import Logistics Chain

This section provides a description of the major processes and security findings of the Import Logistics Chain from a control point perspective. The Unisys Team Unisys analyzed a supply chain for importing cargo into Brazil and has documented the As-Is Logistics Baseline into the following Five (5) discreet business processes / control points:

1. Import Declaration
2. Vessel/ Container Movement
3. Terminal Operations
4. Container Inland Transportation
5. Container Unloading

Due to the nature of the import logistics chain, each discreet process involved at least two business partners. As a result, Unisys organized the import logistics chain into five discreet processes mentioned above. This organization enabled Unisys to view and assess the import logistics chain from both, an individual logistics chain partner and business process/ information/ documentation or control point perspective.

A high level overview of the sequence of Import logistics chain is shown below.

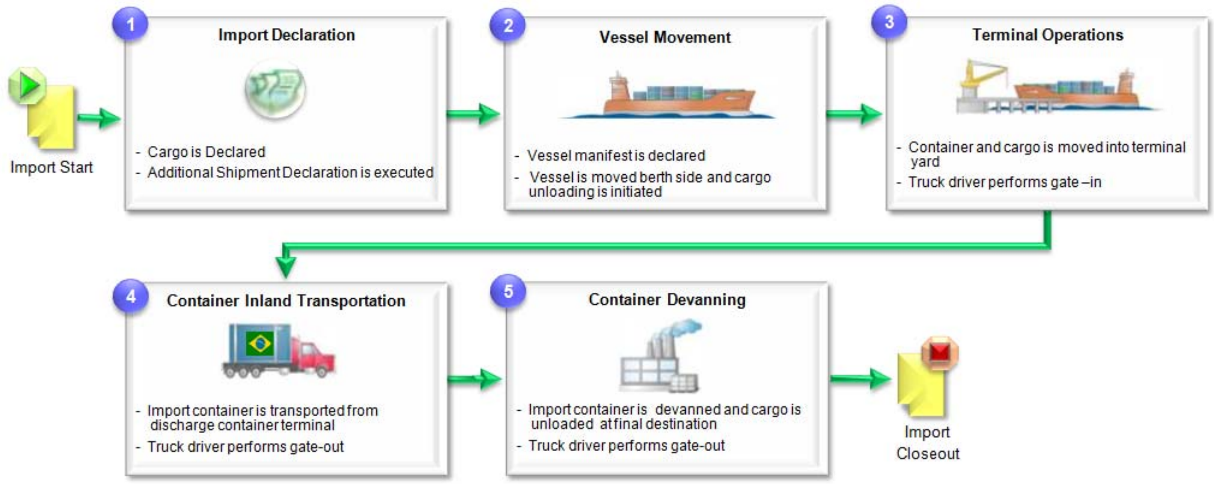


Figure: ICNCP Import Logistics Chain Overview

Additional detail of each of these control points is documented in the section below

Preceding Processes

The logistics chain business processes listed above and described in detail below are preceded by the receipt of the shipment details and the monitoring of the vessel. This also includes the arrival of the documentation needed to initiate the import declaration process in Brazil.

Import Declaration

Description

Import Declaration is the process involving the declaration of imported containers with cargo into the Port of Santos, Brazil.

For the purposes of the ICNCP project, the Import Declaration control point will:

- **Start** with the initiation of the Import License process
- **End** with the Import Declaration and clearance process

Business Process Flow

Illustrated below is the Import Declaration business process flow.

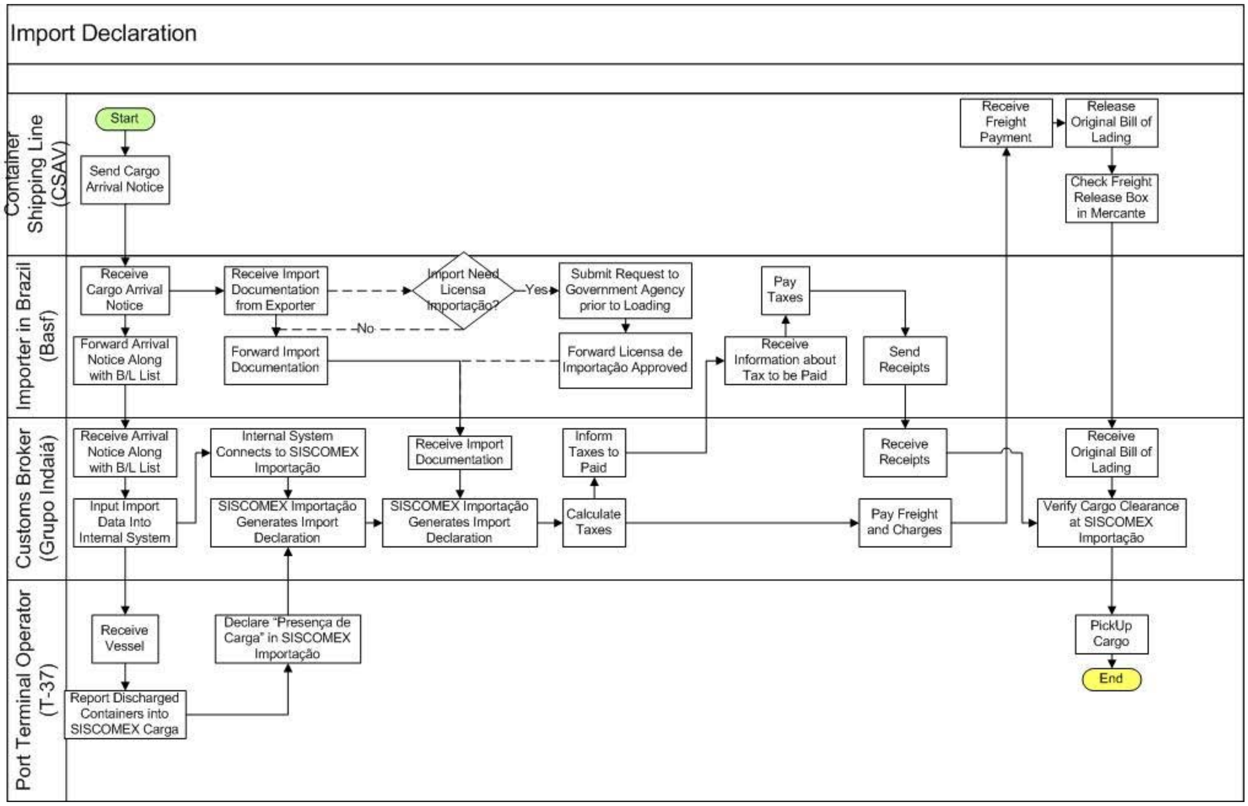


Figure: Import Declaration Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Import Declaration control point for the import of containerized cargo into Brasil:

#	Name	System	Format	From	To
1.	Extract of B/L (Bill of Lading) on the vessel.	Importer System	Email	Shipper/ Importer	Customs Broker
2.	Documentation Package • Bill of Lading • Commercial Invoice • Packing List • Certificate of origin • Quality Certificate	Electronic	Email	Shipper/ Exporter	Shipper/ Importer

#	Name	System	Format	From	To
3.	LI (Licença de Importação)	SISCOMEX Import	Online	Shipper/ Importer	Receita Federal do Brasil
4.	DI (Declaração de Importação)	SISCOMEX Import	Online	Shipper/ Importer	Receita Federal do Brasil
5.	Presença de Carga	SISCOMEX Import	Online	Container Discharge Terminal	Receita Federal do Brasil

Table: Import Declaration transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Import Declaration control point for the import of containerized cargo into Brazil:

#	Name	From	To
1.	LI (Licença de Importação)	Customs Broker/ Shipper/ Importer	Receita Federal do Brasil
2.	Commercial Invoice	Shipper/ Exporter	Customs Broker/ Shipper/ Importer
3.	Bill of Lading	Shipper/ Exporter	Customs Broker/ Shipper/ Importer
4.	Packing List	Shipper/ Exporter	Customs Broker/ Shipper/ Importer
5.	Certificate of origin	Customs Broker/ Importer	Responsible Authority
6.	DI (Declaração de Importação)	Customs Broker/ Importer	Receita Federal do Brasil

Table: Import Declaration documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Import Declaration control point for the import of containerized cargo into Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Hard copy of Import Declarations are not controlled and multiple parties have access to the information

Area of Focus – Physical Security	
#	**Description**
2.	Cargo information is printed out and access to such information is not always controlled
Area of Focus – Policies and Procedures	
#	**Description**
1.	Multiple procedures for the Import Declaration process are performed via a telephone call and is not authenticated (other than existing personal relationships)
Area of Focus – IT Security	
#	**Description**
1.	Email and electronic communication is not encrypted by way of authentication certificates
Area of Focus – Personnel Security	
#	**Description**
1.	Container Shipping Line and Discharge Terminal personnel do not have a challenge response procedure to verify identity
2.	Username and password is required to access Container Shipping Line website/ portals

Table: Import Declaration security observations

Vessel/ Container Movement

Description

Vessel/ Container Movement is the process involving the transportation of imported containers with cargo into the Port of Santos, Brazil. With the exception of shipment tracking and steamship status monitoring, this control point has not been included in the scope and is not addressed by the As-Is Baseline Analysis.

For the purposes of the ICNCP project, the Vessel/ Container Movement control point will:

- **Start** with the vessel arrival at Port of Santos for container discharge
- **End** with the container being discharged from the vessel

Business Process Flow

Illustrated below is the Vessel Movement business process flow.

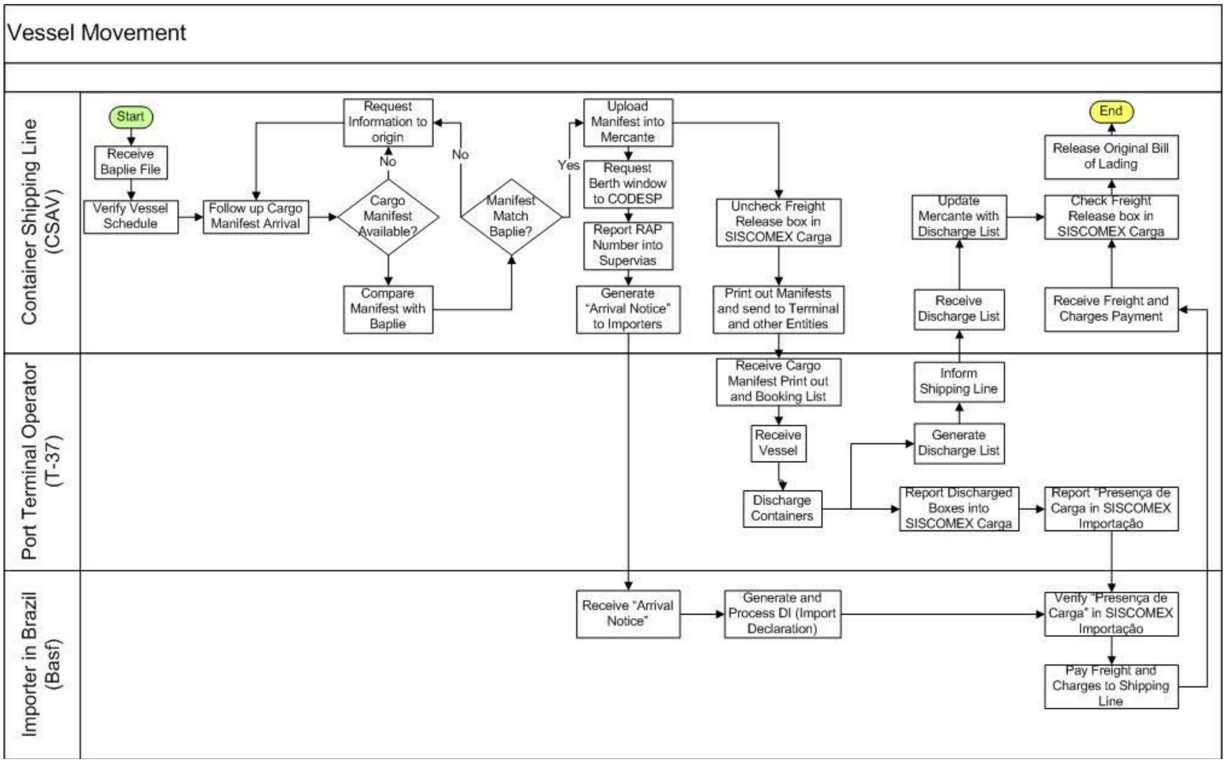


Figure: Vessel Movement Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Vessel Movement control point for the import of containerized cargo into Brazil:

#	Name	System	Format	From	To
1.	Berthing Request	SUPERVIA de Dados	TXT	Container Shipping Line	CODESP
2.	Transport Ministry Outbound Report	Mercante	Manual data entry (vessel, voyage and port of call creation)	Container Shipping Line	Transport Ministry
			TXT (cargo manifest upload)	Container Shipping Line	Transport Ministry

#	Name	System	Format	From	To
3.	Customs and Treasury Report	SISCOMEX Carga	Cargo Manifest, Electronic Bills of Lading Number and freight payment status is reflected into SISCOMEX Carga from Mercante	Transport Ministry	Receita Federal do Brasil

Table: Vessel Movement transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Vessel/ Container Movement control point for the import of containerized cargo into Brazil:

#	Name	From	To
1.	RAP (Requisição de Atracação e Prioridade – Vessel Berth and Priority Request)	Container Shipping Line	CODESP (Cia. Docas do Estado de São Paulo)
2.	Cargo Manifest	Container Shipping Line	Brazilian Transport Ministry Brazilian Receita Federal (Customs and Treasury)

Table: Vessel/ Container Movement documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Vessel/ Container Movement control point for the import of containerized cargo into Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Areas around the vessel are not secured
2.	Ship chandlers and other un-credentialized personnel have varying levels of access to vessels while they are berthed in subsequent ports of call

Area of Focus – IT Security	
#	**Description**
1.	The carrier sends a status message with vessel status information but container status information is not received by the Shipper/ Exporter
Area of Focus – Personnel Security	
#	**Description**
1.	Entry on the vessel requires ID or credential issued and cleared in advance of access

Table: Vessel/ Container Movement security observations

Terminal Operations
Description
Terminal Operations is the process involving the unloading of the import container from an inbound import vessel and the staging and stacking of the stuffed and sealed import containers at the Container Discharge Terminal at the Port of Santos.

For the purposes of the ICNCP project, the Terminal Operations control point will:
- **Start** with the unloading of the sealed container from the Container Shipping Line vessel at the Container terminal facility
- **End** with the truck driver leaving the gate-out of the Container Discharge Terminal facility

Business Process Flow
Illustrated below is the Terminal Operations business process flow.

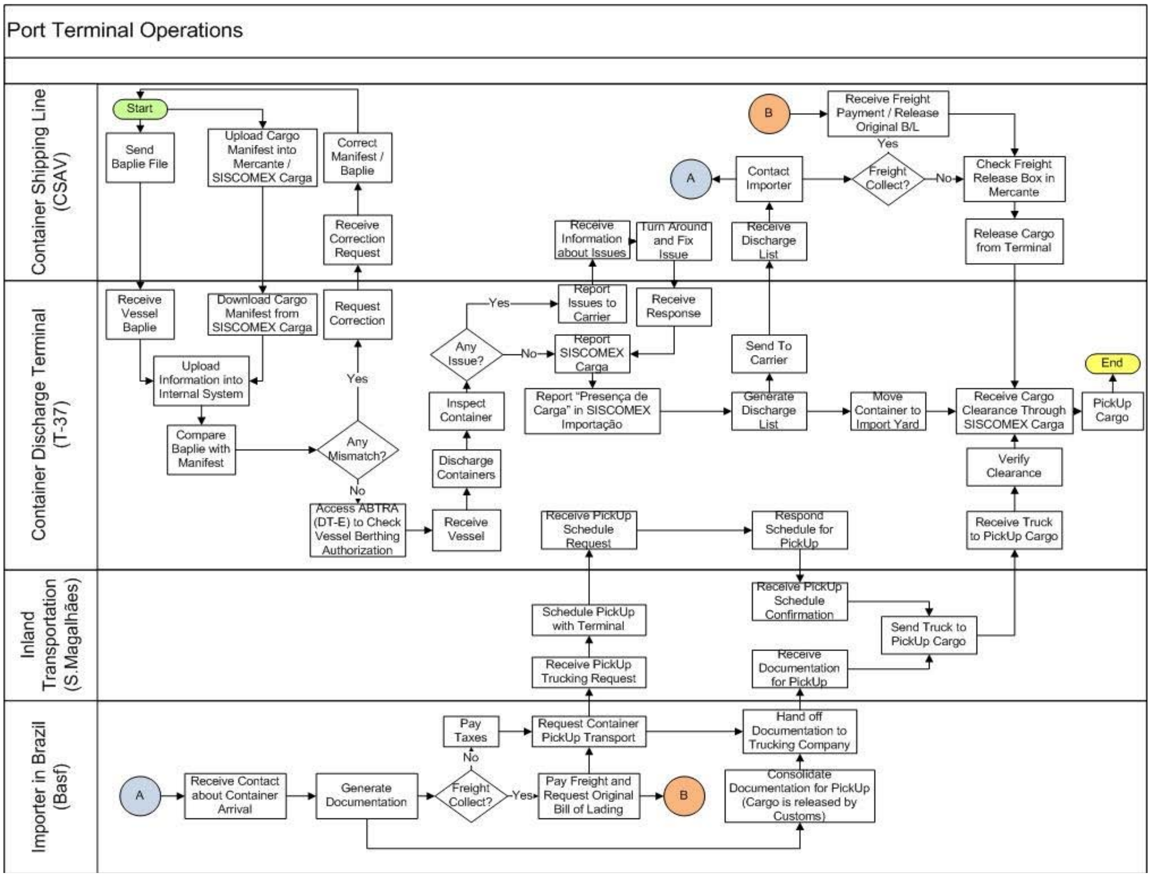


Figure: Terminal Operations Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Terminal Operations control point for the import of containerized cargo into Brasil:

#	Name	System	Format	From	To
1.	BAPLIE	Container Shipping Line system	EDI	Carrier	Container Discharge Terminal
2.	Conhecimento Eletronico	Mercante	Online	Carrier	Shipper/ Importer
3.	DTE	DTE	Packages	Container Discharge Terminal	ABTRA
4.	Cargo Manifest Update	SISCOMEX Carga	Online	Container Discharge Terminal	Receita Federal

#	Name	System	Format	From	To
5.	DI (Declaração de Importação)	SISCOMEX Import	Website/ Stand Alone	Shipper/ Importer	Receita Federal

Table: Terminal Operations transactions and information exchange

Documentation flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Terminal Operations control point for the import of containerized cargo into Brazil:

#	Name	From	To
1.	Container Drop-off Scheduling ticket	Truck Driver	Container Discharge Terminal
2.	Minuta (CTRC – Conhecimento de Transporte Rodoviário de Carga)	Truck Driver	Container Discharge Terminal
3.	Customs Release Notice	Container Stuffing Location	Container Discharge Terminal
4.	Bill of Lading Instruction	Container Stuffing Location	Shipper/ Exporter
5.	Revised Bill of Lading (Final/ Original)	Container Stuffing Location / Shipper/ Exporter	Container Shipping Line
6.	Cargo Fiscal Bill (Nota Fiscal da Carga)	Exporter	Trucking Company
7.	GMCI (Guia de Movimentação de Contêiner Importação).	Terminal Discharge	Inland Transport

Table: Terminal Operations documents

Security Assessment
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Terminal Operations control point for the import of containerized cargo into Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	The import container dwells at the terminal from between ten (10) to twenty-two (22) days. During this dwell time the container could be: • Breached and illicit material taken out from the container • Switched or replaced at the dockside staging area
2.	Containers are only weighed when requested by the commercial customer, hence there is possibility of the presence of contraband within the shipment

Area of Focus – Physical Security	
#	**Description**
3.	In some cases, Gate-in processes are conducted on a semi-public road
4.	There are armed security personnel at all personnel and cargo entry points
Area of Focus – Policies and Procedures	
#	**Description**
1.	Standardized entry procedures and not in place, where not only the identity of the person entering the secure facility is checked, but also the authentication of the credential
2.	Challenge/ response procedures in the secure areas were not found
Area of Focus – IT Security	
#	**Description**
1.	Electronic communications between Container Shipping Line and Container Discharge Terminal are not encrypted and could be modified
2.	Bill of Lading instructions or shipment status modification are not encrypted and may allow changes to container number, plug seal number, etc.
Area of Focus – Personnel Security	
#	**Description**
1.	Replacement IDs/ credentials could be used to enter the facilities

Table: Terminal Operations security observations

Container Inland Transportation

Description

Container Inland Transportation is the process involving the transportation of stuffed and sealed import containers from the Container Discharge Terminal in Santos, Brazil to the Container Devanning location near Santos, Brazil.

For the purposes of the ICNCP project, the Container Inland Transportation control point will:

- **Start** with the check out of the truck driver with the stuffed and sealed import container from the Container Discharge Terminal.
- **End** with the check in of the truck driver at the gate-in at the Container Devanning location

Business Process Flow

Illustrated below is the Container Inland Transportation business process flow.

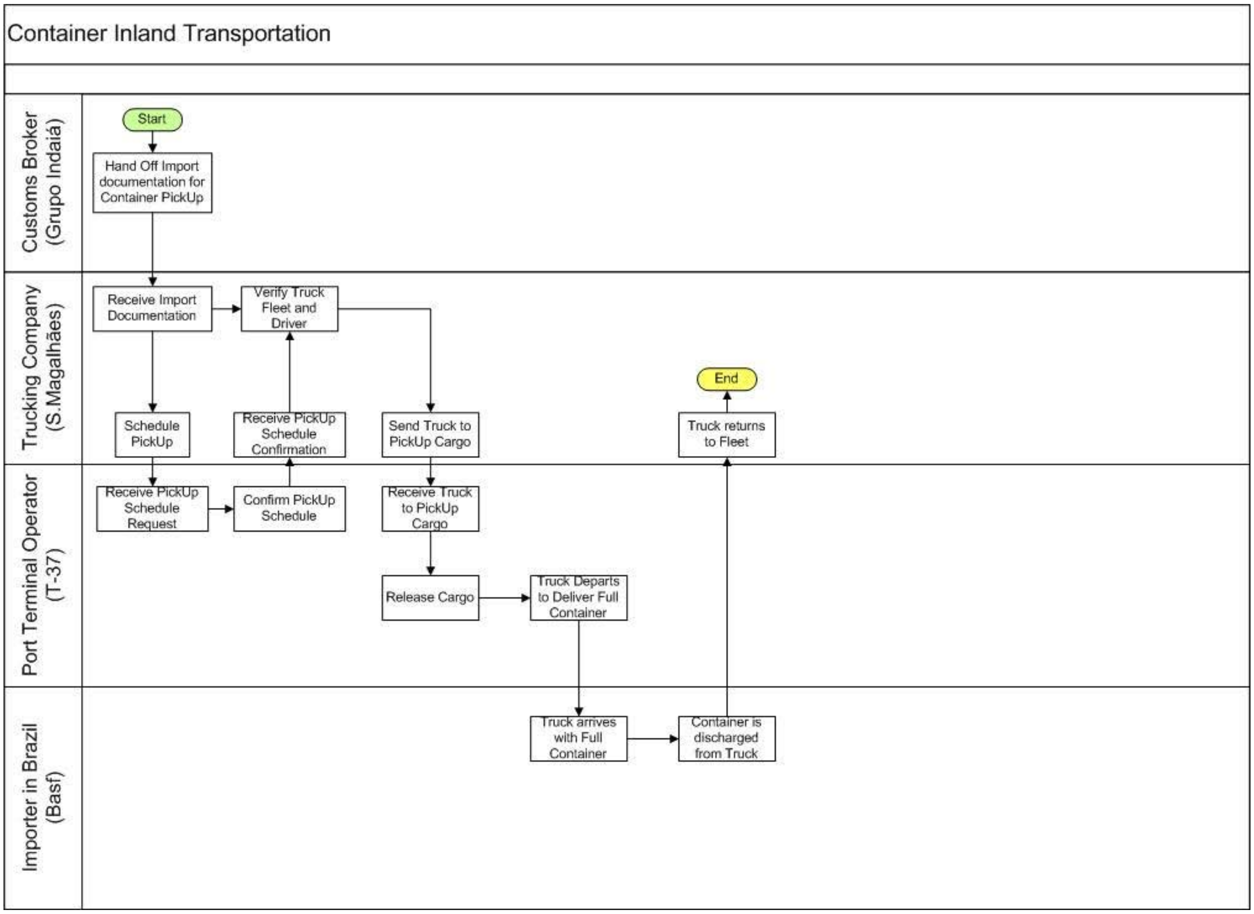


Figure: Container Inland Transportation Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Inland Transportation control point for the import of containerized cargo into Brazil:

#	Name	System	Format	From	To
1.	Cargo information	Container Shipping Line planning system	EDI	Container Shipping Line	Container Discharge Terminal
2.	Container check out and information validation	Container Discharge Terminal – Operating/ Management System		Container Discharge Terminal	Truck Driver
3.	Cargo transportation status	Two-way radio system	Verbal	Truck Driver	Trucking Company

Table: Container Inland Transportation transactions and information exchange

Documentation flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Inland Transportation control point for the import of containerized cargo into Brazil:

#	Name	From	To
1.	Signed Delivery and Load form	Trucking Company	Container Devanning location

Table: Container Inland Transportation documents

Security Assessment
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Inland Transportation control point for the import of containerized cargo into Brazil:

Area of Focus – Physical Security	
#	Description
1.	Containers are not weighed at the gate-out operations in the Container Discharge Terminal
Area of Focus – Policies and Procedures	
#	Description
1.	Truck driver is provided with container seal number information; however there is no standardized process in place for him to check it before he accepts the container.
2.	Truck driver verifies existence of Container Shipping Line seals, but do not know and cannot verify the actual seal number against the carrier's seal number affixed at the point of stuffing
3.	Container Discharge Terminal gate-out check-out times are not compared against arrival times at Gate-in at the Container Devanning location
Area of Focus – IT Security	
#	Description
1.	There are GPS tracking devices on the tractors
2.	In some cases, progress monitoring is conducted manually via Nextel "walkie-talkie" technology on a exception basis at the discretion of the truck driver
Area of Focus – Personnel Security	
#	Description

Area of Focus – Physical Security	
#	Description
1.	The route from the terminal to the final destination is selected by the driver
2.	The truck driver is not accompanied by a supervisor or security personnel on the route from the Container Discharge Terminal to the Container Devanning location

Table: Container Inland Transportation security observations

Container Devanning

Description

Container Devanning is the process involving the validation of the information and devanning of stuffed and sealed import containers at the Container Devanning location near Santos, Brazil.

For the purposes of the ICNCP project, the Container Devanning control point will:

- **Start** with the check in of the truck driver at Container Devanning location.
- **End** with the check out of the truck driver from Container Devanning location.

Business Process Flow

Illustrated below is the Container Devanning business process flow.

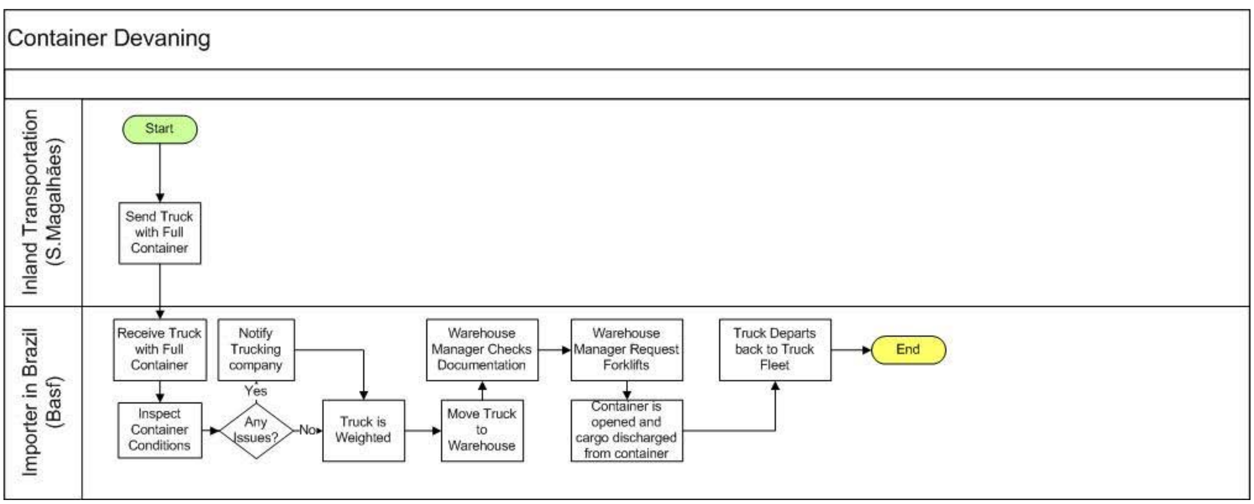


Figure: Container Devanning Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Devanning control point for the import of containerized cargo into Brazil:

#	Name	System	Format	From	To

#	Name	System	Format	From	To
1.	Container gate-in and information submission validation	Container Devanning location system	System	Truck Driver	Container Devanning location
2.	Weight ticket – In/Out	Container Devanning location system	Hard copy	Container Devanning location	Truck driver
3.	Inbound tally	Container Devanning location	System	Container Devanning location	Shipper/ Importer

Table: Container Devanning transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Devanning control point for the import of containerized cargo into Brazil:

#	Name	From	To
1.	Minuta - Conhecimento de Transporte Rodoviário.	Trucking Company	Container Devanning location
2.	DI (Declaração de Importação)	Customs Broker	Container Devanning location
3.	Comprovante de pagamento ICMS	Customs Broker	Container Devanning location
4.	“Check List” de equipamentos	Container Devanning location	Trucking Company
5.	Boleto de Descarga	Container Devanning location	Trucking Company

Table: Container Devanning documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Devanning control point for the import of containerized cargo into Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Seal number of import container is not checked by the unloading dock personnel before devanning the container
2.	Container Devanning location personnel verify existence of carrier bolt seals, but do not know and cannot verify the actual seal number against the carrier’s seal number affixed at the point of stuffing

Area of Focus – Policies and Procedures	
#	Description
1.	Container Devanning location is not provided with Container Shipping Line seal number in advance.
3.	The sealed container is left unsupervised outside of the facility for varying periods of time
Area of Focus – IT Security	
#	Description
1.	Information shared with the Container Devanning location is not encrypted
Area of Focus – Personnel Security	
#	Description
1.	A thorough background check on the truck driver is not performed before granting him access into the secure Container Devanning location
2.	All entry and exit points of the Container Devanning location are monitored using a CCTV system

Table: Container Devanning security observations

Cabotage (Out) Logistics Chain

This section provides a description of the major processes and security findings of the Cabotage (out) Logistics Chain from a control point perspective. The Unisys Team analyzed a cabotage logistics chain consisting of the domestic movement of containerized cargo outbound from the Port of Vitória, Brazil and has documented the As-Is Logistics Baseline into the following Six (6) discreet business processes / control points:

1. Container Demand
2. Empty Container and Cargo Movement
3. Container Stuffing
4. Container Inland Transportation
5. Terminal Operations
6. Vessel Movement

Due to the nature of the cabotage (out) logistics chain, each discreet process involved at least two business partners. As a result, Unisys organized the export logistics chain into six discreet processes mentioned above. This organization enabled Unisys to view and assess the export logistics chain from an individual logistics chain partner and business process/ information/ documentation or control point perspective.

A high level overview of the sequence of cabotage (out) logistics chain is shown below.

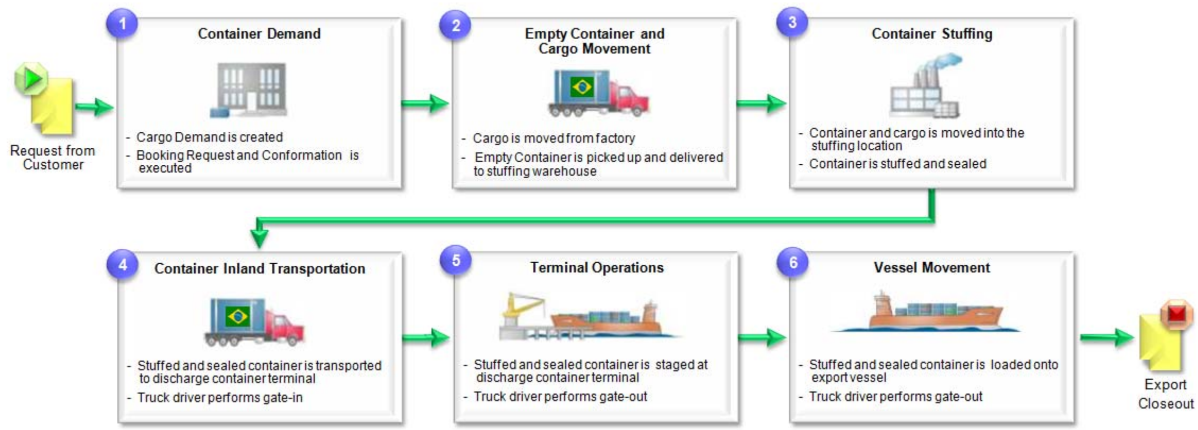


Figure: ICNCP Cabotage (out) Logistics Chain Overview

Preceding Processes

The logistics chain business processes listed above and described in detail below are preceded by the strategic and demand planning exercise that determines the quantity of cargo to be shipped. By having determined cargo volume, the Container Shipping Line is contracted by way of the commercial agreements and the container demand process is initiated.

Container Demand

Description

Container Demand process initiates the cargo movement activities for a cabotage (out) logistics chain involving the domestic movement of containerized cargo from the Port of Vitória, Brazil. Within the scope of the ICNCP project, it serves as the starting control point of the As-Is Baseline activities.

For the purposes of the ICNCP project, the Container Demand control point will:

- **Start** with the booking request made by shipper/ exporter with the Container Shipping Line
- **End** with the receipt of the booking confirmation and delivery of shipping instructions from shipper/exporter to all relevant entities

Business Process Flow

Illustrated below is the Container Demand business process flow.

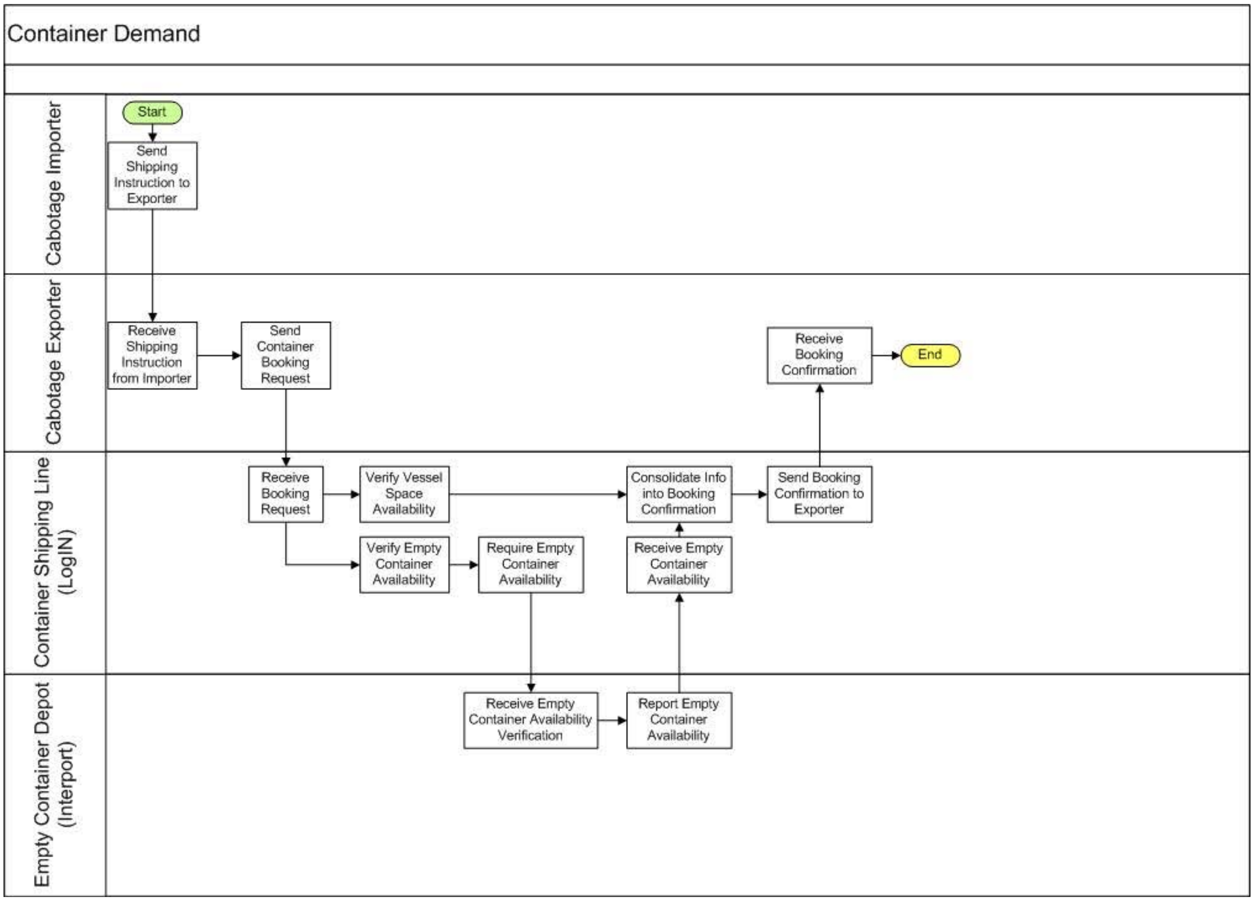


Figure: Container Demand Business Process Flow

Information Flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Demand control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Shipping Instruction	Email system	Email	Brazil Importer	Brazil Shipper/ Exporter
2.	Booking Request	• Container Shipping Line website/ Internet portal • Phone system • Email system	• EDI • Phone • Email	Shipper/ Exporter	Container Shipping Line
3.	Booking Confirmation	• Container Shipping Line website/ Internet portal	• EDI • Phone • Email	Container Shipping Line	Shipper/ Exporter

#	Name	System	Format	From	To
		• Phone system • Email system	• Phone • Email	Shipper/ Exporter	Trucking Company
4.	Empty Container Fleet Allocation	• Container Shipping Line website/ Internet portal • Email system	• EDI • Email	Container Shipping Line	Empty Container Terminal/ Depot

Table: Container Demand transactions and information exchange

Documentation flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Demand control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Shipping Instruction	Brazil Importer	Brazil Shipper/ Exporter
2.	Booking Request	Shipper/ Exporter	Container Shipping Line
3.	Booking Confirmation	Shipper/ Exporter	• Trucking Company • Container Stuffing Location
4.	Empty Container Fleet Allocation Report	Container Shipping Line	Empty Container Terminal/ Depot

Table: Container Demand documents

Security Assessment
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Demand control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Hard copy of Shipping Instructions are not controlled and multiple parties have access to the information
2.	Booking Confirmation information is printed out and access to such information is not always controlled
Area of Focus – Policies and Procedures	
#	**Description**

Area of Focus – Physical Security	
#	**Description**
1.	Booking request is performed via a telephone call and is not authenticated (other than existing personal relationships)
2.	Containers can be booked within the deadline period, especially in the cases of large export logistics chains
Area of Focus – IT Security	
#	**Description**
1.	Email and electronic communication is not encrypted by way of authentication certificates
Area of Focus – Personnel Security	
#	**Description**
1.	Container Shipping Line personnel do not have a challenge response procedure to verify identity
2.	Username and password is required to access Container Shipping Line website/ portals

Table: Container Demand security observations

Empty Container and Cargo Movement

Description

Empty Container and Cargo Movement is the process involving the inland transport of the:

- Empty export containers from the empty container depot to the stuffing location
- Cargo from the manufacturing facility to the container stuffing location.

For the purposes of the ICNCP project, the Empty Container control point will:

- **Start** with empty container request from the Container Shipping Line
- **End** with the delivery of the empty container to the stuffing warehouse.

Cargo Movement control point will:

- **Start** with exporter's cargo shipping request from production site to the container stuffing warehouse
- **End** with cargo delivered at container stuffing warehouse for cabotage (out)

Business Process Flow

Illustrated below is the empty Container and cargo movement business process flow.

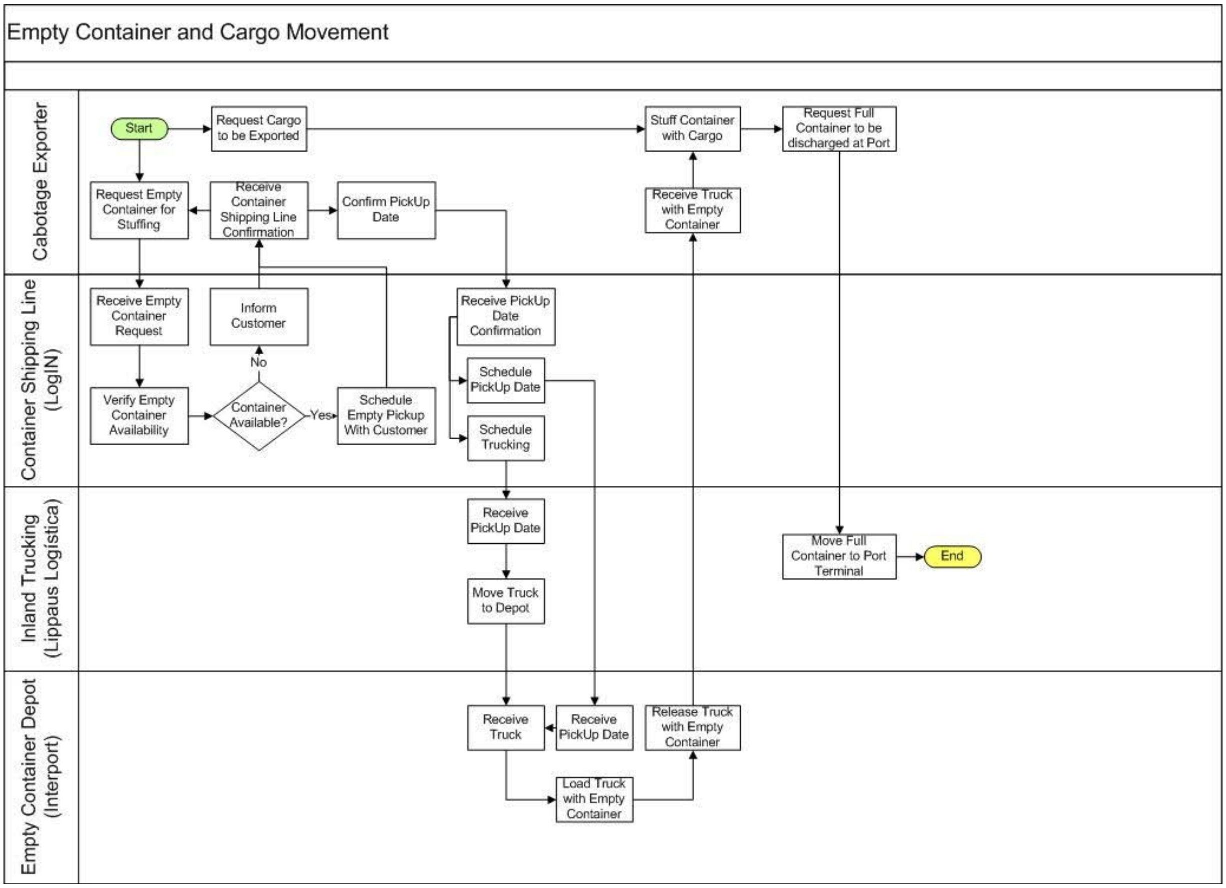


Figure: Empty Container and Cargo Movement Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Empty Container and Cargo Movement control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Booking Confirmation	• Email system	• EDI • Email	Container Shipping Line	Empty Container Depot
2.	Empty Container Availability	• Email system	• EDI • Email	Empty Container Depot	Container Shipping Line

Table: Empty Container and Cargo Movement transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Empty Container and Cargo Movement control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

Empty Container Movement

#	Name	From	To
1.	Container List (Relação de Conteineres)	Empty Depot	Container Shipping Line
2.	Booking Confirmation (Confirmação de Reserva)	Container Shipping Line	Empty Depot
3.	Equipment Interchange Receipt (EIR)	Empty Depot	Trucking Company

Table: Empty Container Movement documents

Cargo Movement

#	Name	From	To
1.	Proforma Invoice	Exporter	Trucking Company
2.	Booking Request	Exporter	Container Shipping Line
3.	CTAC – Conhecimento de Transporte Aquaviário de Carga (Brazil Intra-Country Bill of Lading)	Container Shipping Line	Exporter Receita Federal
3.	Booking Confirmation	Container Shipping Line	Exporter
4.	Cargo Fiscal Bill (Nota Fiscal da Carga)	Exporter	Trucking Company
5.	CTRC – Conhecimento de Transporte Rodoviário de Carga (Cargo Inland Bill)	Trucking Company	Receita Federal
6.	Transport Fiscal Bill (Nota Fiscal de Transporte)	Trucking Company	Receita Federal

Table: Cargo Movement documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Empty Container and Cargo Movement control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Empty containers are regularly picked up and stored overnight at the truck driver's personal residence
2.	Containers are inspected for holes, smell and discoloration, but not for identification of container modifications such as modified compartments false backs, false bottoms, hollowed beams, etc.

Area of Focus – Policies and Procedures	
#	**Description**
1.	Empty container and seal information is not consistently delivered by the Trucking Company to the Shipper/ Exporter
2.	Driver, empty container and seal information is not always delivered to the Container Stuffing location prior to stuffing
3.	Empty Containers are not sealed utilizing a standardized process across all Container Shipping Lines
Area of Focus – IT Security	
#	**Description**
1.	The Shipping Instruction email from Shipper/ Exporter to the Trucking Company and the Stuffing Location is not encrypted and not verified
2.	Trucks are tracked by GPS technology while in transit from Exporter Production site until Stuffing Terminal/Warehouse facility
3.	Empty Container Terminal is monitored by closed circuit camera system
Area of Focus – Personnel Security	
#	**Description**
1.	Container Shipping Line personnel do not have a challenge response procedure to verify identity
2.	Username and password is required to access Container Shipping Line website/ portals

Table: Empty Container and Cargo Movement security observations

Container Stuffing

Description

Container Stuffing is the process involving the checking, stuffing and sealing of dry containers for domestic cabotage (out) cargo, at the container stuffing location.

For the purposes of the ICNCP project pilot the Container Stuffing control point will:

- **Start** with the check in of the truck drivers at the container stuffing location
- **End** with the check out of the stuffed and sealed container from the container stuffing location

Business Process Flow

Illustrated below is the Container Stuffing business process flow.

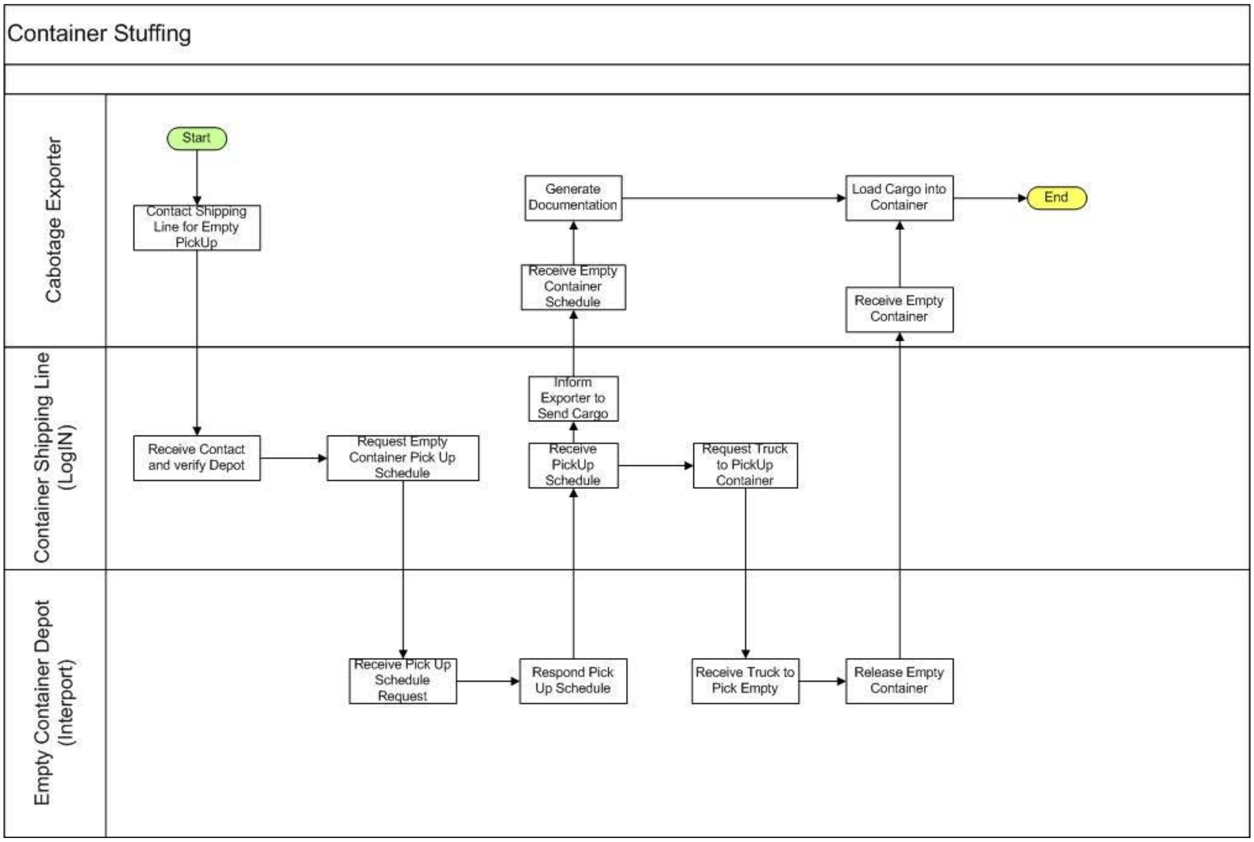


Figure: Container Stuffing Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Stuffing control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Shipping Instruction	Email	Email	Shipper/ Exporter	Container Stuffing Location
2.	Determination	Telephone/ Email	Call/Email	Terminal/ Warehouse	Empty Container Terminal
3.	Confirmation/ Scheduling	Email	Email	Terminal/ Warehouse	Empty Container Terminal
4.	Request Cargo (Only Stuffing Terminal).	Telephone/ Email	Call/ Email	Terminal	Export

Table: Container Stuffing transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Stuffing control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Request Empty Container	Container Shipping Line	Empty Container Terminal
2.	RIC (Relatório de Intercâmbio de Conteiner).	Depot/ Empty Terminal	Container Stuffing Location
3.	CTRC (Conhecimento de Transporte Rodoviário de Carga)	Stuffing Terminal	Container Shipping Line

Table: Container Stuffing documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Stuffing control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Stuffing process is conducted in a facility with limited perimeter security
2.	Container is sealed with the steamship line's low quality plug seal mentioned in the preceding control point
3.	Entries and key areas are supervised by armed guards
Area of Focus – Policies and Procedures	
#	**Description**
1.	Cargo contents are randomly selected for test and inspected for damage and bag marks but not for contraband materials
2.	Container Stuffing location does not weights empty container at gate-in
Area of Focus – IT Security	
#	**Description**
1.	All secure areas of the Container Stuffing location have CCTV coverage
Area of Focus – Personnel Security	
#	**Description**

Area of Focus – Physical Security	
#	**Description**
1.	There is no standardized access control system at the Container Stuffing location

Table: Container Stuffing security observations

Container Inland Transportation

Description

The Container Inland Transportation is the process involving the transportation of stuffed and sealed export containers from the Container Stuffing location to the Container Discharge Terminal at the Port of Vitória.

For the purposes of the ICNCP project, the Container Inland Transportation control point will:

- **Start** with the check out of the truck driver with the stuffed and sealed container from the Container Stuffing location.
- **End** with the check in of the truck driver at the gate-in at the Container Discharge Terminal and validation of the Delivery and Load form information with the booking information by the terminal personnel.

Business Process Flow

Illustrated below is the Container Inland Transportation business process flow.

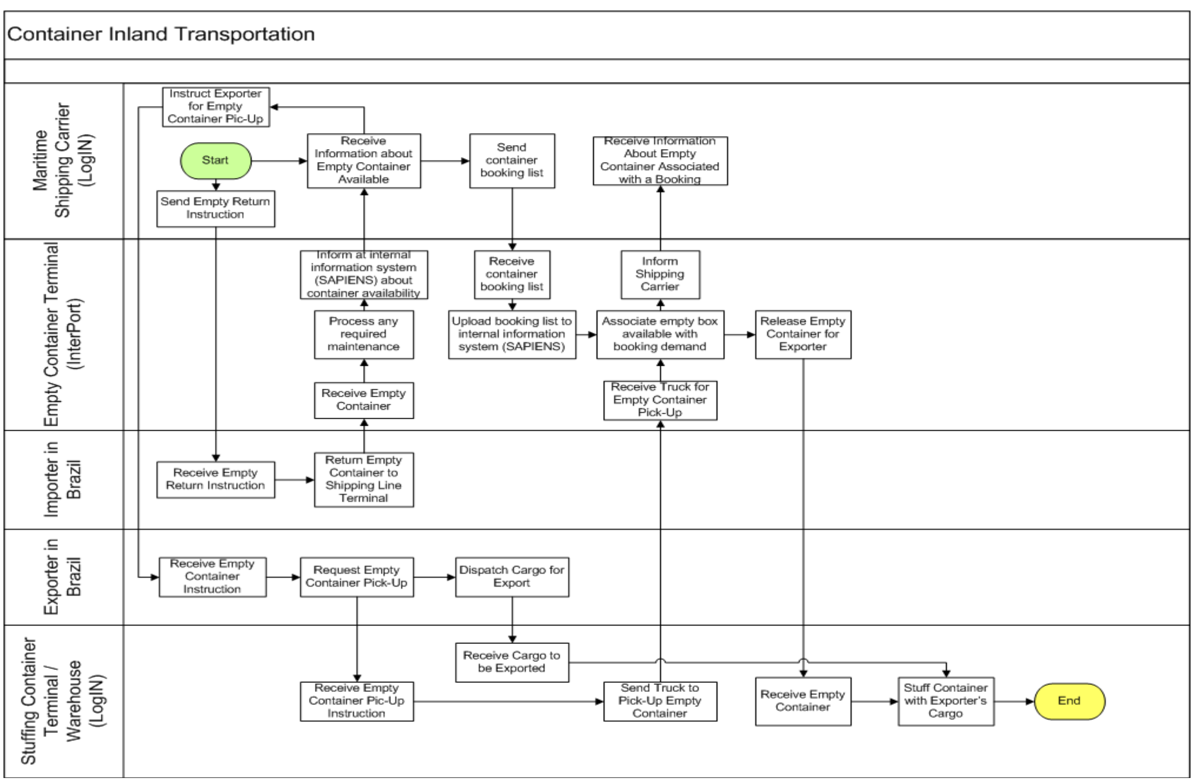


Figure: Container Inland Transportation Business Process Flow.

Information Flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Inland Transportation control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Booking Confirmation information	Container Shipping Line planning system	EDI	Container Shipping Line	Container Discharge Terminal
2.	Container check in and booking information validation	Container Discharge Terminal – Operating/ Management System		Container Discharge Terminal	Truck Driver

Table: Container Inland Transportation transactions and information exchange

Documentation flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Inland Transportation control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Signed Delivery and Load form	Trucking Company	Container Stuffing location

Table: Container Inland Transportation documents

Security Assessment
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Inland Transportation control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Drivers are instructed to continue without stop to the port facilities, however check-in at the port facility can be delayed due to in-transit and gate-in traffic significantly altering travel times
2.	Trucks transporting the stuffed and sealed container have GPS units and are tracked on a real-time basis.
Area of Focus – Policies and Procedures	
#	**Description**

Area of Focus – Physical Security	
#	Description
1.	Containers are weighed upon entering the Container Discharge Terminal. However, due to the nature of cargo, weights naturally vary due to environmental reasons by as much as 1%. Contraband can be inserted into a container with a weight impact that is less than this allowable weight variance
2.	Although GPS technology is used to track the truck cab, no standardized process exists in case of an occurrence of an anomaly such as a breakdown or deviation from the existing delivery route
Area of Focus – IT Security	
#	**Description**
1.	Information recorded by the Container Stuffing location is shared with other logistics chain partners without any encryption
2.	The GPS units are not always secured to prevent tampering with them
Area of Focus – Personnel Security	
#	**Description**
1.	A large percent of the truck drivers are sub-contracted personnel, who have not gone through a thorough background check
2.	Information on the validity of personnel credentials is not checked consistently

Table: Container Inland Transportation security observations

Terminal Operations

Description

The Terminal Operations is the process involving the staging and stacking of the stuffed and sealed cabotage (out) containers at the Container Discharge Terminal at the Port of Vitória and the loading of the container on to an outbound export vessel.

For the purposes of the ICNCP project, the Terminal Operations control point will:

- **Start** with the truck driver leaving the first gate and checking in at the second gate within the Container Discharge Terminal facilities.
- **End** with the loading of the sealed container on the Container Shipping Line vessel at the terminal facility followed by the receipt of the revised Original Bill of Lading by Shipper/ Exporter from the Container Shipping Line.

Business Process Flow

Illustrated below is the Terminal Operations business process flow.

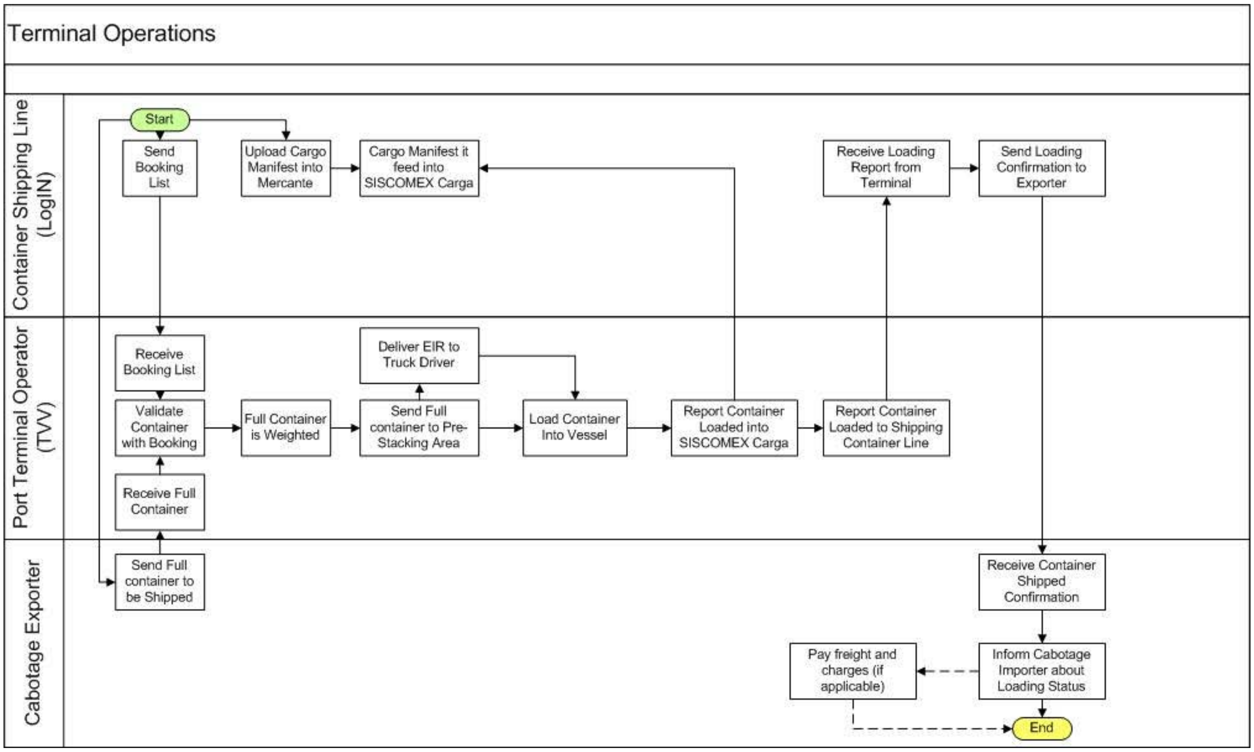


Figure: Terminal Operations Business Process Flow.

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Terminal Operations control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Booking Confirmation	• Container Shipping Line system • Email • Phone	• XML • Email • Phone	Shipper/ Exporter	Container Shipping Line
2.	Booking Confirmation	Container Shipping Line system	EDI	Container Shipping Line	Container Discharge Terminal
3.	FINAL Bill of Lading (CTAC – Conhecimento de Transporte Aquaviário de Carga)	Container Shipping Line system	Print	Container Shipping Line	Shipper/ Exporter
4.	CE (Conhecimento Eletrônico)	Mercante	Web Site	Container Shipping Line	Transport Ministry

Table: Terminal Operations transactions and information exchange

Documentation flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Terminal Operations control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Container Drop-off Scheduling ticket	Truck Driver	Container Discharge Terminal
2.	Minuta (CTRC – Conhecimento de Transporte Rodoviário de Carga)	Truck Driver	Container Discharge Terminal
3.	Customs Release Notice	Container Stuffing Location	Container Discharge Terminal
4.	CTAC – Conhecimento de Transporte Aquaviário de Carga (Brazil Intra-Country Bill of Lading)	Container Shipping Line	Shipper / Exporter Receita Federal

Table: Terminal Operations documents

Security Assessment
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Terminal Operations control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Containers are only weighed when requested by the commercial customer, hence there is possibility of the presence of contraband within the shipment
Area of Focus – Policies and Procedures	
#	**Description**
1.	Standardized entry procedures and not in place, where not only the identity of the person entering the secure facility is checked, but also the authentication of the credential
2.	Challenge/ response procedures in the secure areas were not found
Area of Focus – IT Security	
#	**Description**
1.	Electronic communications between Container Shipping Line and Container Discharge Terminal are not encrypted and could be modified
2.	Bill of Lading instructions or shipment status modification are not encrypted and may allow changes to container number, plug seal number, etc.
Area of Focus – Personnel Security	

#	Description
1.	Replacement IDs/ credentials could be used to enter the facilities

Table: Terminal Operations security observations

Vessel Movement

Description

Vessel Movement is the process involving the transportation of stuffed and sealed dry containers with cargo from Port of Vitória, Brazil to the Port of Rio Grande. With the exception of shipment tracking and steamship status monitoring, this control point has not been included in the scope and is not addressed by the As-Is Baseline Analysis.

For the purposes of the ICNCP project, the Vessel Movement control point will:

- **Start** with the arrival of the vessel at Port of Vitória for the loading of containers
- **End** with the departure of the vessel from the Port of Vitória

Business Process Flow

Illustrated below is the Vessel Movement business process flow.

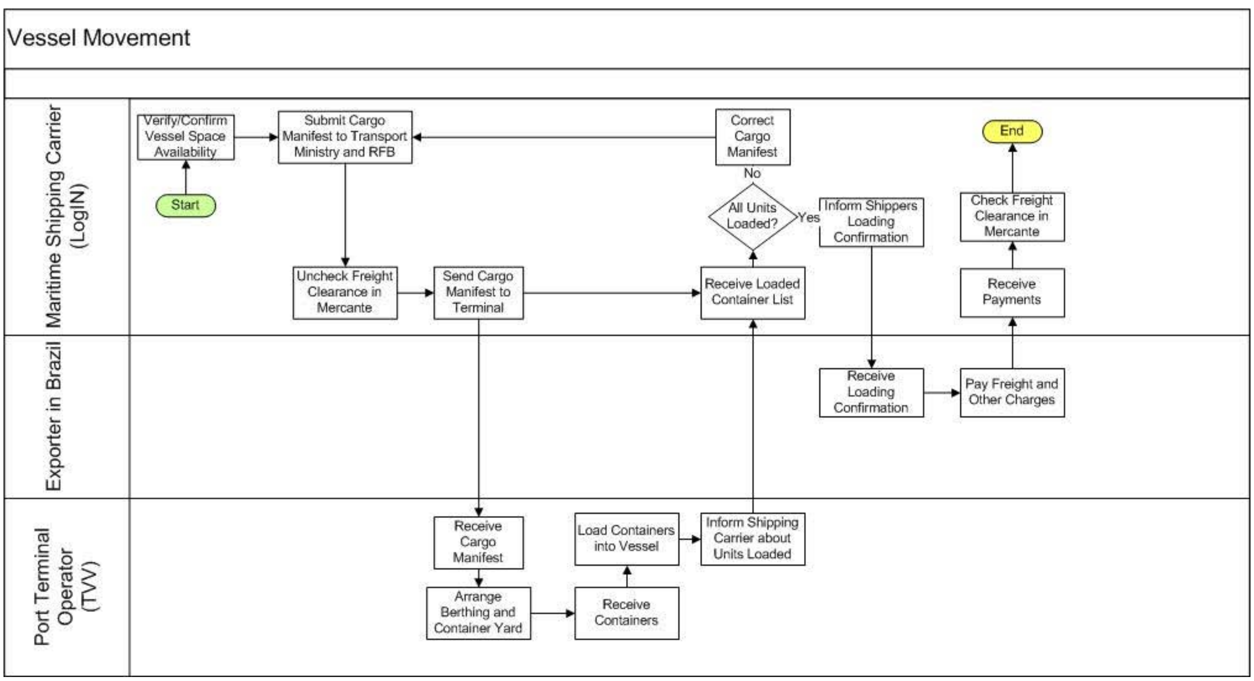


Figure: Vessel Movement Business Process Flow.

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Vessel Movement control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Transport Ministry Outbound Report	Mercante	Manual data entry (vessel, voyage and port of call creation)	Container Shipping Line	Transport Ministry
			Txt (cargo manifest upload)	Container Shipping Line	Transport Ministry
2.	Customs and Treasury Report	SISCOMEX Carga	Cargo Manifest, Electronic Bills of Lading Number and freight payment status is reflected into SISCOMEX Carga from Mercante	Transport Ministry	Receita Federal do Brasil

Table: Vessel Movement transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Vessel Movement control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Cargo Manifest	Container Shipping Line	Brazilian Transport Ministry
			Receita Federal do Brasil

Table: Vessel Movement documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Vessel Movement control point for the cabotage (out) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	Description

Area of Focus – Physical Security	
#	Description
1.	Areas around the vessel are not secured
2.	Ship chandlers and other un-credentialized personnel have varying levels of access to vessels while they are berthed in subsequent ports of call
Area of Focus – IT Security	
#	Description
1.	The carrier sends a status message with vessel status information but container status information is not received by the Shipper/ Exporter
Area of Focus – Personnel Security	
#	Description
1.	Entry on the vessel requires ID or credential issued and cleared in advance of access

Table: Vessel Movement security observations

Cabotage (In) Logistics Chain

This section provides a description of the major processes and security findings of the Cabotage (in) Logistics Chain from a control point perspective. The Unisys Team analyzed a cabotage logistics chain consisting of the domestic movement of containerized cargo inbound into the Port of Vitória, Brazil and has documented the As-Is Logistics Baseline into the following Five (5) discreet business processes / control points:

1. Vessel/ Container Movement
2. Terminal Operations
3. Container Inland Transportation
4. Container Unloading

Due to the nature of the cabotage (in) logistics chain, each discreet process involved at least two business partners. As a result, Unisys organized the export logistics chain into five discreet processes mentioned above. This organization enabled Unisys to view and assess the import logistics chain from an individual logistics chain partner and business process/ information/ documentation or control point perspective.

A high level overview of the sequence of cabotage (in) logistics chain is shown below.

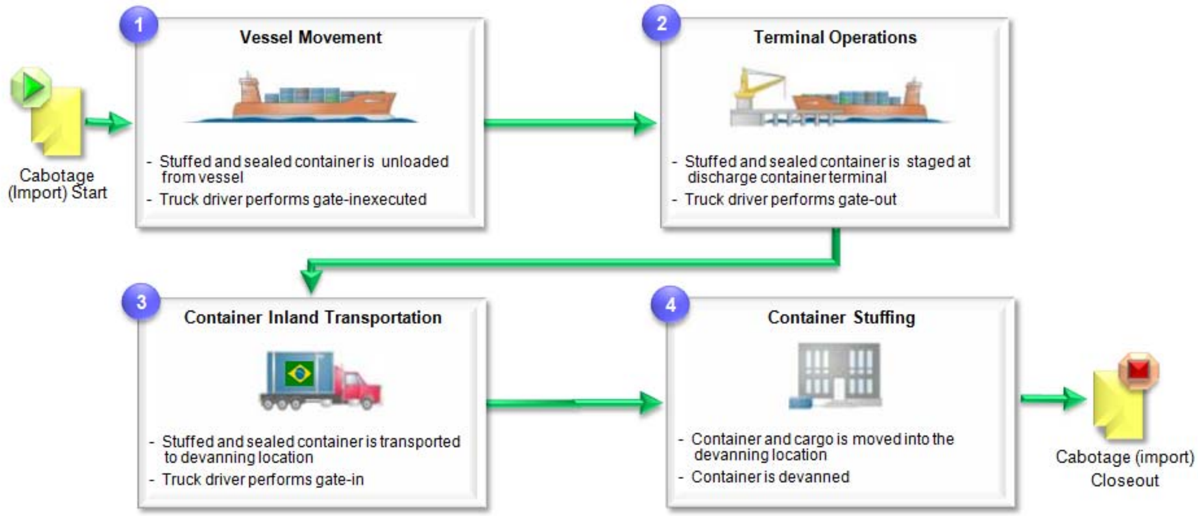


Figure: ICNCP Import Logistics Chain Overview

Additional detail of each of these control points is documented in the section below

Preceding Processes

The logistics chain business processes listed above and described in detail below are preceded by the receipt of the shipment details and the monitoring of the vessel. This also includes the arrival of the documentation needed to initiate the declaration process in Brazil.

Vessel/ Container Movement

Description

Vessel Movement is the process involving the transportation of stuffed and sealed dry containers with cargo into the Port of Vitória, Brazil from the Port of Rio Grande. With the exception of shipment tracking and steamship status monitoring, this control point has not been included in the scope and is not addressed by the As-Is Baseline Analysis.

For the purposes of the ICNCP project, the Vessel Movement control point will:

- **Start** with the arrival of the vessel at Port of Vitória for the unloading of export containers
- **End** with the departure of the vessel from the Port of Vitória

Business Process Flow

Illustrated below is the Vessel Movement business process flow.

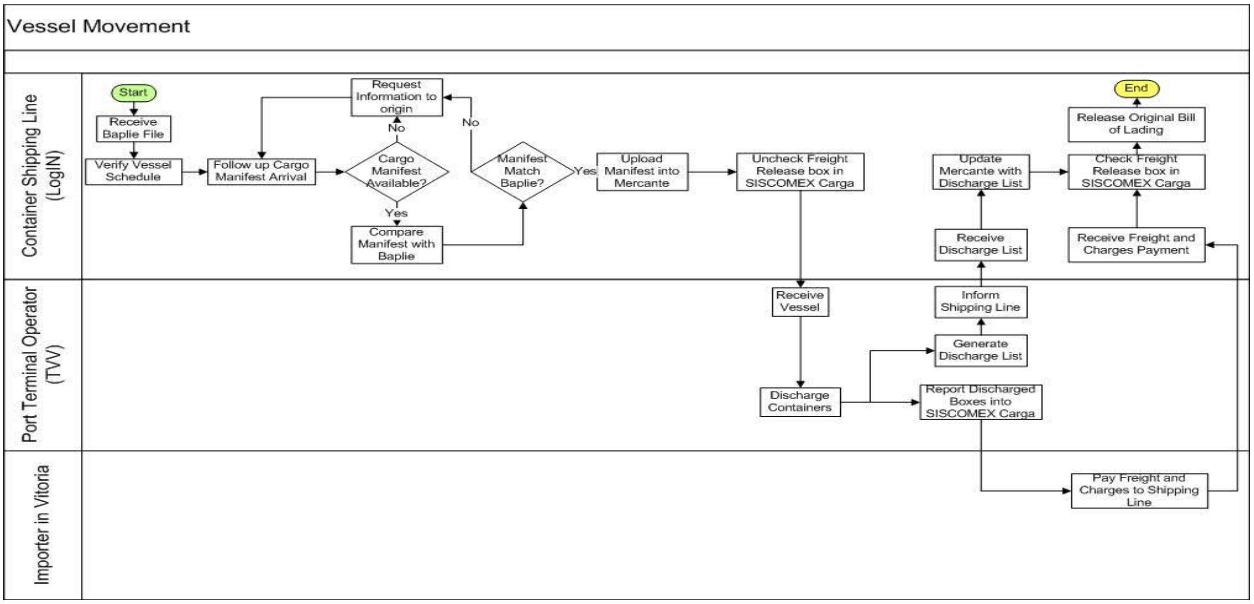


Figure: Vessel Movement Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Vessel Movement control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Transport Ministry Outbound Report	Mercante	Manual data entry (vessel, voyage and port of call creation)	Container Shipping Line	Transport Ministry
			TXT (cargo manifest upload)	Container Shipping Line	Transport Ministry

#	Name	System	Format	From	To
2.	Customs and Treasury Report	SISCOMEX Carga	Cargo Manifest, Electronic Bills of Lading Number and freight payment status is reflected into SISCOMEX Carga from Mercante	Transport Ministry	Receita Federal do Brasil

Table: Vessel Movement transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Vessel Movement control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Cargo Manifest	Container Shipping Line	Brazilian Transport Ministry
			Brazilian Receita Federal (Customs and Treasury)

Table: Vessel/ Container Movement documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Vessel Movement control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Areas around the vessel are not secured
2.	Ship chandlers and other un-credentialized personnel have varying levels of access to vessels while they are berthed in subsequent ports of call
Area of Focus – IT Security	
#	**Description**
1.	The carrier sends a status message with vessel status information but container status information is not received by the Shipper/ Exporter

Area of Focus – Personnel Security	
#	Description
1.	Entry on the vessel requires ID or credential issued and cleared in advance of access

Table: Vessel/ Container Movement security observations

Terminal Operations

Description

The Terminal Operations is the process involving the staging and stacking of the stuffed and sealed cabotage (in) containers at the Container Discharge Terminal at the Port of Vitória.

For the purposes of the ICNCP project, the Terminal Operations control point will:

- **Start** with the unloading of the sealed container from the Container Shipping Line vessel at the terminal facility.
- **End** with the truck driver entering the gate and checking in within the Container Discharge Terminal facilities.

Business Process Flow

Illustrated below is the Terminal Operations business process flow.

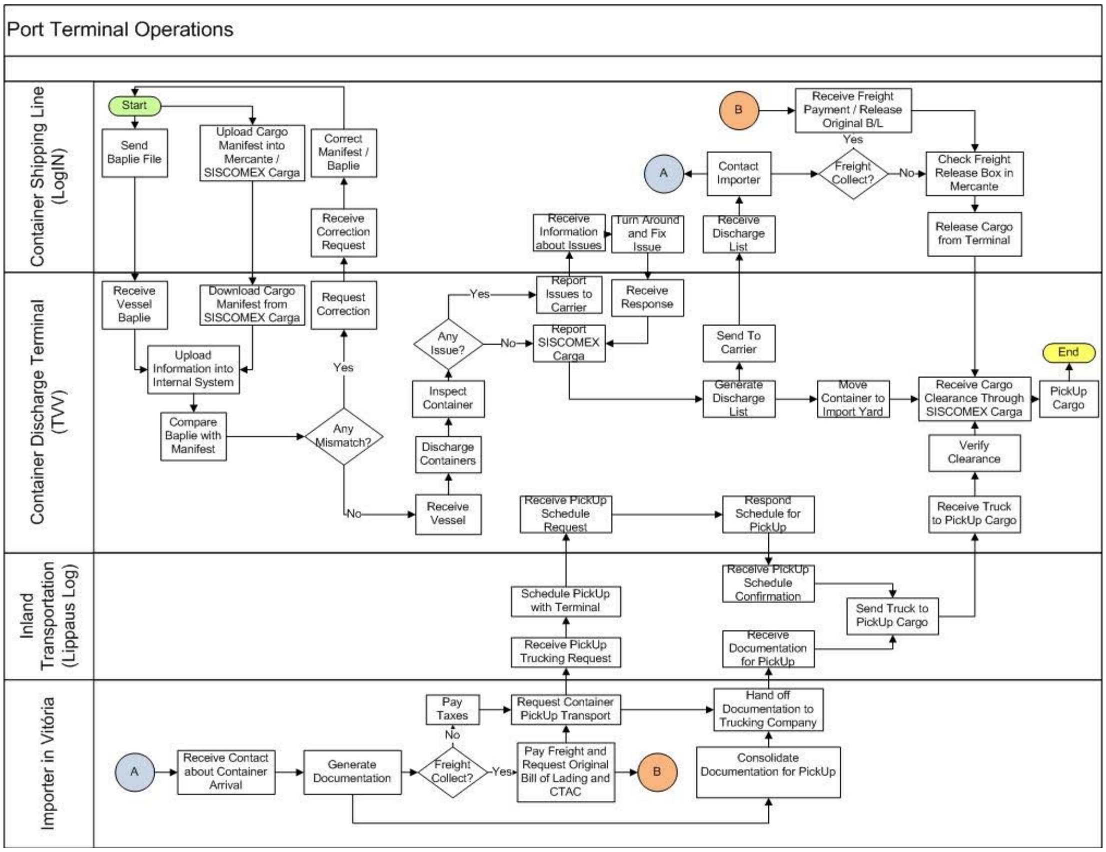


Figure: Terminal Operations Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Terminal Operations control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	BAPLIE	Container Shipping Line system	EDI	Carrier	Container Discharge Terminal
2.	Conhecimento Eletronico	Mercante	Online	Carrier	Shipper/ Importer
3.	DTE	DTE	Packages	Container Discharge Terminal	ABTRA
4.	Cargo Manifest Update	SISCOMEX Carga	Online	Container Discharge Terminal	Receita Federal
5.	DI (Declaração de Importação)	SISCOMEX Import	Website/ Stand Alone	Shipper/ Importer	Receita Federal

Table: Terminal Operations transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Terminal Operations control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Container Drop-off Scheduling ticket	Truck Driver	Container Discharge Terminal
2.	Minuta (CTRC – Conhecimento de Transporte Rodoviário de Carga)	Truck Driver	Container Discharge Terminal
3.	Customs Release Notice	Container Stuffing Location	Container Discharge Terminal
4.	Bill of Lading Instruction	Container Stuffing Location	Shipper/ Exporter
5.	Revised Bill of Lading (Final/ Original)	Container Stuffing Location / Shipper/ Exporter	Container Shipping Line
6.	Cargo Fiscal Bill (Nota Fiscal da Carga)	Exporter	Trucking Company

#	Name	From	To
7.	GMCI (Guia de Movimentação de Contêiner Importação).	Terminal Discharge	Inland Transport

Table: Terminal Operations documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Terminal Operations control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	The import container dwells at the terminal from between ten (10) to twenty-two (22) days. During this dwell time the container could be: • Breached and illicit material taken out from the container • Switched or replaced at the dockside staging area
2.	Containers are only weighed when requested by the commercial customer, hence there is possibility of the presence of contraband within the shipment
3.	In some cases, Gate-in processes are conducted on a semi-public road
4.	There are armed security personnel at all personnel and cargo entry points
Area of Focus – Policies and Procedures	
#	**Description**
1.	Standardized entry procedures and not in place, where not only the identity of the person entering the secure facility is checked, but also the authentication of the credential
2.	Challenge/ response procedures in the secure areas were not found
Area of Focus – IT Security	
#	**Description**
1.	Electronic communications between Container Shipping Line and Container Discharge Terminal are not encrypted and could be modified
2.	Bill of Lading instructions or shipment status modification are not encrypted and may allow changes to container number, plug seal number, etc.
Area of Focus – Personnel Security	
#	**Description**
1.	Replacement IDs/ credentials could be used to enter the facilities

Table: Terminal Operations security observations

Container Inland Transportation

Description

The Container Inland Transportation is the process involving the transportation of stuffed and sealed cabotage (in) containers from the Container Discharge Terminal at the Port of Vitória to the Container Devanning location.

For the purposes of the ICNCP project, the Container Inland Transportation control point will:

- **Start** with the check out of the truck driver with the stuffed and sealed cabotage (in) containers from the Container Discharge Terminal.
- **End** with the check in of the truck driver at the gate-in at the Container Devanning location

Business Process Flow

Illustrated below is the Container Inland Transportation business process flow.

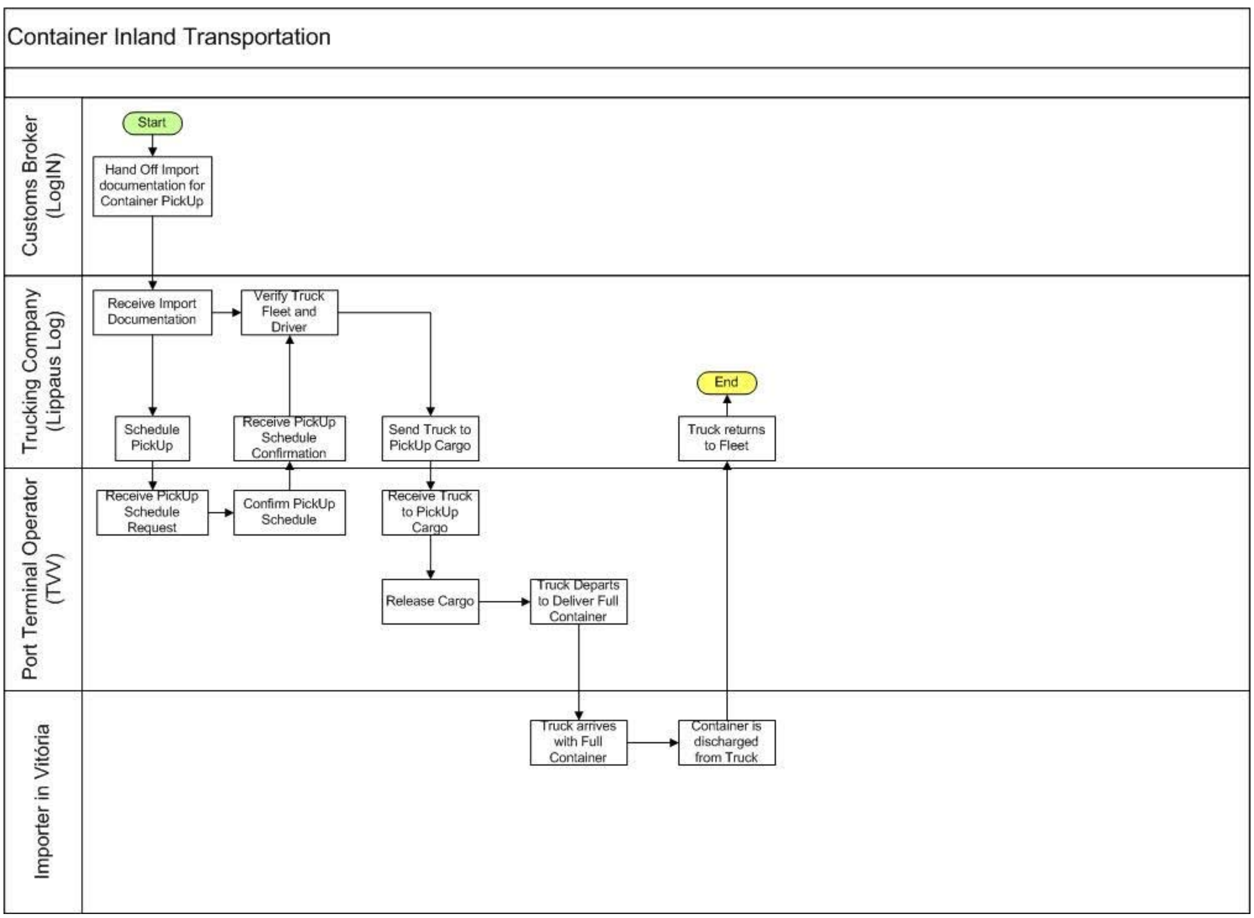


Figure: Container Inland Transportation Business Process Flow

Information Flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Container Inland Transportation control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Cargo information	Container Shipping Line planning system	EDI	Container Shipping Line	Container Discharge Terminal
2.	Container check out and information validation	Container Discharge Terminal – Operating/ Management System		Container Discharge Terminal	Truck Driver
3.	Cargo transportation status	Two-way radio system	Verbal	Truck Driver	Trucking Company

Table: Container Inland Transportation transactions and information exchange

Documentation flow
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Inland Transportation control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Signed Delivery and Load form	Trucking Company	Container Devanning location

Table: Container Inland Transportation documents

Security Assessment
Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Inland Transportation control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Containers are not weighed at the gate-out operations in the Container Discharge Terminal
Area of Focus – Policies and Procedures	
#	**Description**

Area of Focus – Physical Security	
#	Description
1.	Truck driver is provided with container seal number information; however there is no standardized process in place for him to check it before he accepts the container.
2.	Truck driver verifies existence of Container Shipping Line seals, but do not know and cannot verify the actual seal number against the carrier's seal number affixed at the point of stuffing
3.	Container Discharge Terminal gate-out check-out times are not compared against arrival times at Gate-in at the Container Devanning location
Area of Focus – IT Security	
#	**Description**
1.	There are GPS tracking devices on the tractors
2.	In some cases, progress monitoring is conducted manually via Nextel "walkie-talkie" technology on a exception basis at the discretion of the truck driver
Area of Focus – Personnel Security	
#	**Description**
1.	The route from the terminal to the final destination is selected by the driver
2.	The truck driver is not accompanied by a supervisor or security personnel on the route from the Container Discharge Terminal to the Container Devanning location

Table: Container Inland Transportation security observations

Container Devanning

Description

Container Devanning is the process involving the validation of the information and devanning of stuffed and sealed cabotage (in) containers at the Container Devanning location near the Port of Vitória

For the purposes of the ICNCP project, the Container Devanning control point will:

- **Start** with the check in of the truck driver at Container Devanning location.
- **End** with the check out of the truck driver from Container Devanning location.

Business Process Flow

Illustrated below is the Container Devanning business process flow.

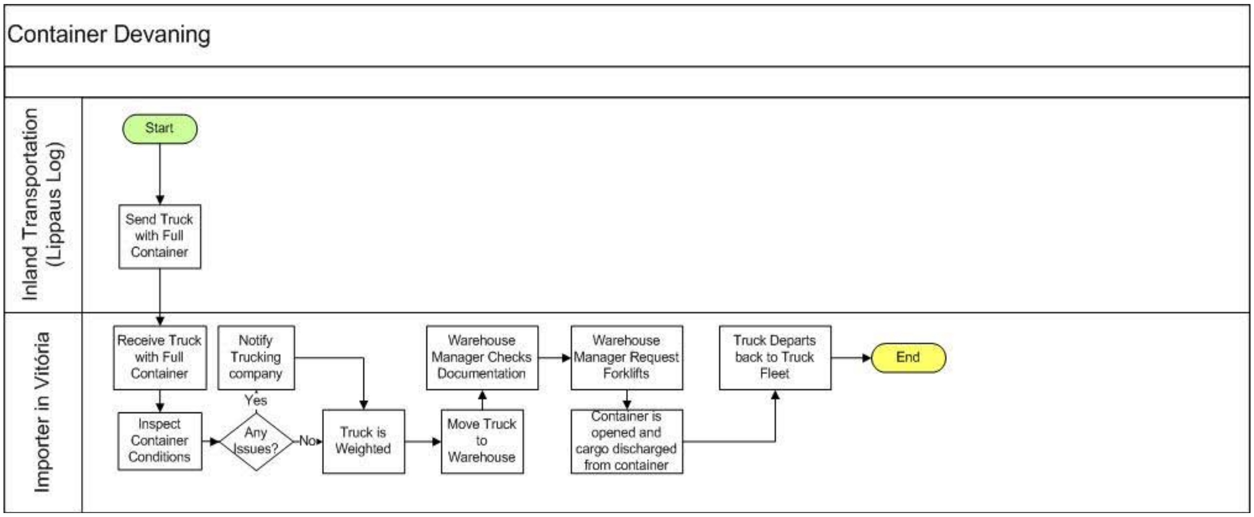


Figure: Container Devanning Business Process Flow

Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies and systems used to exchange information in the Container Devanning control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

#	Name	System	Format	From	To
1.	Container gate-in and information submission validation	Container Devanning location system	System	Truck Driver	Container Devanning location
2.	Weight ticket – In/Out	Container Devanning location system	Hard copy	Container Devanning location	Truck driver
3.	Inbound tally	Container Devanning location	System	Container Devanning location	Shipper/ Importer

Table: Container Devanning transactions and information exchange

Documentation flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key documents generated, received and processed in the Container Devanning control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

#	Name	From	To
1.	Minuta - Conhecimento de Transporte Rodoviário.	Trucking Company	Container Devanning location
3.	Comprovante de pagamento ICMS	Customs Broker	Container Devanning location

#	Name	From	To
3.	“Check List” de equipamentos	Container Devanning location	Trucking Company
4.	Boleto de Descarga	Container Devanning location	Trucking Company

Table: Container Devanning documents

Security Assessment

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key security related observations in the Container Devanning control point for the cabotage (in) movement of containerized cargo domestically within Brazil:

Area of Focus – Physical Security	
#	**Description**
1.	Seal number of import container is not checked by the unloading dock personnel before devanning the container
2.	Container Devanning location personnel verify existence of carrier bolt seals, but do not know and cannot verify the actual seal number against the carrier’s seal number affixed at the point of stuffing
Area of Focus – Policies and Procedures	
#	**Description**
1.	Container Devanning location is not provided with Container Shipping Line seal number in advance.
3.	The sealed container is left unsupervised outside of the facility for varying periods of time
Area of Focus – IT Security	
#	**Description**
1.	Information shared with the Container Devanning location is not encrypted
Area of Focus – Personnel Security	
#	**Description**
1.	A thorough background check on the truck driver is not performed before granting him access into the secure Container Devanning location
2.	All entry and exit points of the Container Devanning location are monitored using a CCTV system

Table: Container Devanning security observations

2.2 Phase 2 - Defining the Intelligent Cargo and Intelligent Network Logistics Chain

In keeping with the goals of Intelligent Cargo and Intelligent Network Port Logistics Chain (ICNCP) Project to balance trade and security and enhance the flow of containerized export cargo, the Unisys Team with guidance from SEP, has focused on developing a To-Be solution that is:

- **Low-tech** - does not employ high tech smart container devices
- **Low-cost** - limiting the amount of investment needed from the public and private sector entities
- **Non-invasive** – leveraging business process and lessons learned with a minimal footprint
- **Practical** – utilizing industry best practices that have been successfully deployed in the past
- **Deployable** - in the short to medium timeframe, minimizing the amount of time needed by the logistics chain partners to utilize the solution in their current operations.

Utilizing high level design requirements mentioned above, the Unisys Team has developed a To-Be solution which is made up of the following components:

- Business Process Enhancements
- Cargo Monitoring Mechanism
- Systems Integration and Information Exchange

Shown below are the high level components of the To-Be Solution

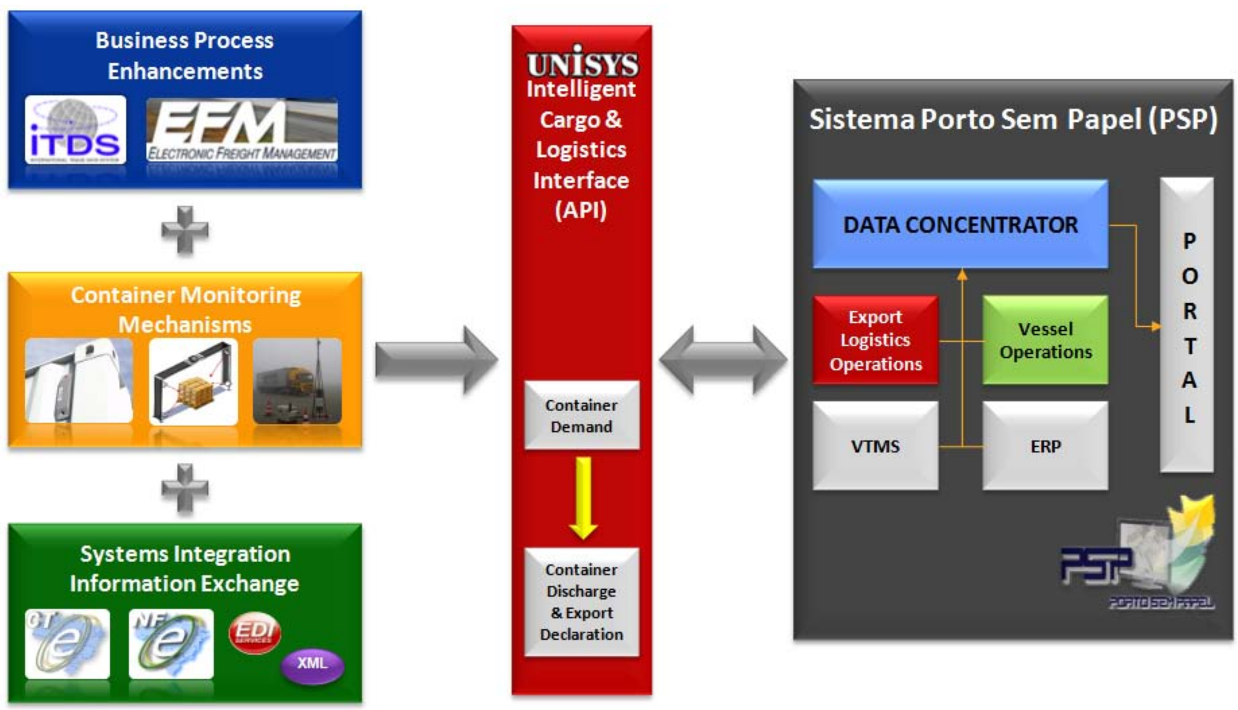


Figure: To-Be Solution high level components

This approach was used, so that the Unisys Team could break the To-Be solution into simple pieces across the Export Logistics chain by:

- Using Industry & International Best Practices
- Utilizing standard based Cargo Monitoring Mechanism such as RFID
- Integrating Disparate Logistics Chain data source
- Designing of an Automated Programmable Interface (API)
- Enhancing the existing data model for collection key transactions for Sistema Porto Sem Papel (PSP) Logistics Module

2.2.1 ICNCP Best Practices/ Business Process Enhancements

In surveying logistics monitoring technologies, systems, communications, practices, and procedures throughout the world, the Unisys Team identified and assessed the most valid best practices for intelligent cargo and logistics networks. This effort was conducted with a focus on monitoring capabilities, information sharing between national and international governmental agencies, integration of information across the logistics chain, data timeliness, and data reliability.

With a focus on best practices and business process enhancements, the Unisys Team identified and assessed the best practices for intelligent cargo and logistics networks. The effort was divided into four key areas:

- **International Mandates** such as the World Customs Organization (WCO) SAFE Framework
- **Logistics Industry Best Practices** and projects such as the U.S. based Electronic Freight Management (EFM) Initiative
- Currently **Deployed systems** such as the International Trade Data System (ITDS)
- **Lessons learned** from past projects executed by Unisys such as Operation Safe Commerce (OSC), Secure Corridor, Container Security Device (CSD) program and Secure Freight Security Architecture (SCSA)

Additionally, the Unisys Team took into account the As-Is Baseline phase - Business Process findings and acquired feedback from the Logistics Chain Stakeholders to update the overall business process.

After collecting all the relevant information on Business Process and Best Practices, the Unisys Team utilized the information to develop the Business Process Enhancements component of the To-Be Solution so that it has a Low Footprint that does not drastically change the current Export Logistics processes, can be deployed via basic training of the stakeholder participants, utilizes the usage of Low Technology, practical solutions and that can be deployed in a short timeframe of six to eight months (6-8 months)

Documented below is the analysis of two Best Practices that the Unisys Team analyzed to enhance the existing business processes of the Export Logistics Chain.

International Trade Data System (ITDS)

Using the U.S. International Trade Data System (ITDS) best practices and several international standards set by the WCO and UNECE, this section describes a potential model to use as a tool for coordinating intergovernmental participation for the control of exports from Brasil. Processing cargo through a port depends on a number of entities to facilitate all activities necessary to successfully accomplish the export and import of goods. Those entities include governmental bodies, agencies, authorities, and private companies. These entities seek the best methods to carry out their processes often without the necessary level of integration with other entities of the Federal Government and the Port Community.

Phase 1 of ICNCP project identified the existence of many automated processes in the logistics chains; however, they are designed to meet the needs of merely one particular agency, port, or function so there is no uniformity of documents and procedures in Brasilian ports for export of cargo. Some of the issues identified included:

- Lack of information or difficulty in obtaining accurate data
- Problems of communication and information flow
- Redundant information
- Procedures, systems and documents are not standardized
- Lack of appropriate operational security
- Redundant data sources

Based upon both Phase 1 findings and the best practices from U.S. ITDS and international standards, the following approach to developing a more optimized coordinated border management for exports (CBM Export) is proposed.

International Standards

WCO SAFE provides an international set of best practices for identifying and sharing data between the private sector and government. WCO Revised Kyoto Convention is recognized as an international standard, and used as a benchmark, for the global Customs community. It contains modern Customs formalities and procedures, harmonized Customs documents for use in international trade and transport, and provides for the use of risk management techniques and the optimal use of information technology by Customs administrations.

WCO Integrated Supply Chain Management (ISCM) Guidelines provide implementation guidelines on who has to provide which information to whom for risk assessment, when and how the information has to be provided, used and protected, and what facilitation customs should provide to those security partners in the private sector.
UN/CEFACT Recommendation No. 33 includes recommendations and guidelines on establishing a single window to enhance the efficient exchange of information between trade and government.

ITDS Best Practices

The purpose of ITDS is to eliminate redundant information requirements, to efficiently regulate the flow of commerce, and to effectively enforce laws and regulations relating to international trade, by establishing a single portal system, operated by CBP, for the collection and distribution of standard electronic import and export data required by all participating government agencies (PGAs). It is meant to include all processes for advance screening and targeting, release of goods, payment of duties, taxes and fees, and post declaration processing.

Currently, ITDS assists participating government agencies (PGAs) in identifying, documenting, and executing their plans to use the Automated Commercial Environment (ACE) to improve their business operations and further their agency missions. This includes the creation and maintenance of the ITDS Standard Data Set (SDS), a comprehensive, harmonized collection of data requirements related to international trade and U.S. border regulatory and enforcement processes. The SDS elements to be collected, stored, and shared in ITDS are consistent with U.S. law, international obligations, and are compatible with the commitments of the U.S. as a member of the WCO and WTO.

ITDS is intended to provide for a single electronic filing of reporting requirements by the trade community rather than separate paper and electronic filings to multiple agencies. It will also help the government to provide more accurate, complete, and timely trade data and enhance government agencies' ability to improve security, both commercial and national, by targeting risky cargo, persons, and conveyances.

ICNCP To-be Solution Mapping

Together with the ITDS example, these international standards will provide the basis for developing a *Solution Map* that can be implemented by [SEP] to bring about the optimization of CBM and a "single window" for export shipments. In this context, optimization is defined as use of those standards that best apply to the particular demands of the local supply chain so as to increase the effectiveness and efficiency of both the government and private sector import and export business processes.

ITDS Best Practices

The organizational structure for such a Model should have a mechanism for determining the trade data collection and distribution requirements and capabilities for public and private sector entities. ITDS is guided by an interagency Board of Directors, which is chaired by the Secretary of the Department of the Treasury and staffed by representatives of CBP and Participating Government Agencies (PGAs). The Board provides executive leadership and direction and works with PGAs on all issues related to border integration. There are also ITDS Board of Director Committees, working groups, and Integrated Product Teams that serve as forums for discussion and resolution of ITDS issues. Each committee plays a key role in guiding program efforts toward successful implementation of ITDS. The ITDS Board of Directors also works with CBP, the entity that is responsible for building and implementing the automated portal, ACE. The government is required to consult with private sector members of the trade community regarding the development and implementation of ITDS and ACE.

Since it has been in place for two years the organizational structure for the Porto Sem Papel Project (see chart below) could serve as the basis for development of such a mechanism but with a wider scope, a more robust mandate, and additional resources.

Figure: Porto Sem Papel Project Organizational Structure

As with the Brasilian government agencies, U.S. PGAs have international trade missions including:

- Control over admission or export of cargo, crew, and conveyances
- Regulation of compliance with federal trade laws such as tariffs and quotas, licenses, and operating authorities
- Promotion of international trade through activities such as export assistance, and
- Collection and reporting of statistical information about international trade and transportation.

ICNCP To-be Solution Mapping

The following chart illustrates a CBM for Export organization model, based upon ITDS best practice and international standards

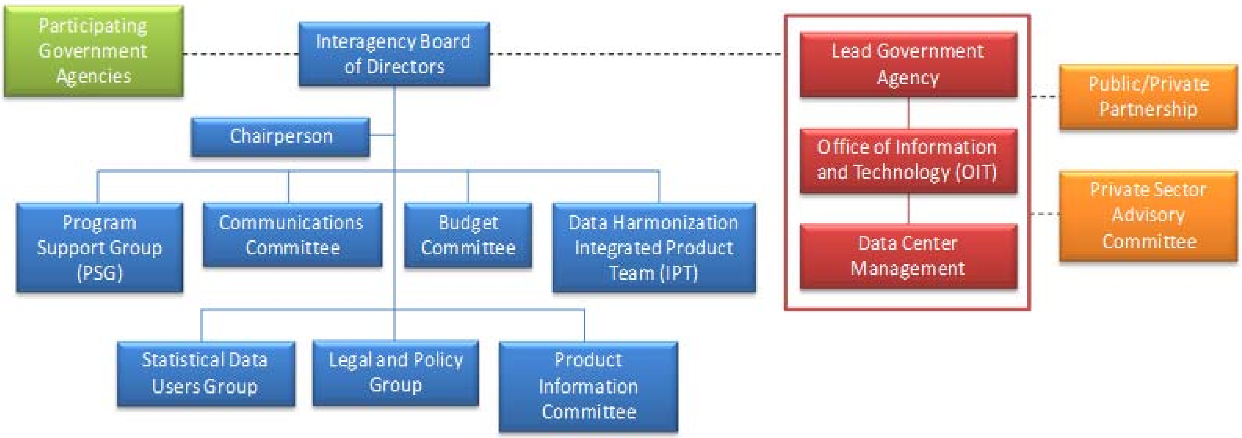


Figure: Recommended Organizational Structure based on ITDS Best Practices and International Standards

Standard Data Set

The WCO Data model Single Window Data Harmonization, Version 2, February 2007 provides: *As governments and their trade communities begin to develop a Single Window environment, there is an understandable concern about the size of the data set. While the data set may be large, the intention is that it will be the maximum set of data that Trade may have to provide. The important message to deliver to Trade is that the entire data set will never be required for any one transaction. This WCO Data Model based standard data set covers all transactions (export, national transit and import), all modes (air, maritime, road and rail), and all requirements of all cross border activities related agencies. It is logically and logistically impossible to require all of the data for any one transaction.*

The WCO Customs Data Model enables the various information systems of a Customs service, its trading partners, as well as cooperating Customs and other regulatory authorities, to work together in the most effective way possible. It is comprised of various components (see chart to the left).

The international code standards agreed for the usage of the WCO Customs Data Model. International code standards enable communication in places where ordinary spoken or written language is difficult or impossible. Moreover, codes represent data in a way which is more resistant to errors in transmission or storage or allow the same information to be sent with fewer characters, more quickly, and most important, less expensively. In order to ensure that information keeps the same content after the process of encoding and decoding, it is necessary to agree on common codes between sender and receiver.

ITDS Best Practices

The Standard Data Set (SDS) is a comprehensive list of data elements to support the international trade process and U.S. border legal, regulatory, and enforcement responsibilities. It is a superset of all required/desired data and their associated definitions, which has been harmonized to under 400 data elements from 10,000 data elements collected from 26 agencies.

ICNCP To-be Solution Mapping

The development of a more comprehensive PSP to serve the wider CBM community should utilize a standard data set that includes data elements required for each stakeholder in the export process (i.e. cargo demand, cargo movement, empty container, container stuffing, inland transport, etc.). For optimization, this data set should be mapped to the WCO Data Model. From discussions with those countries that have or are implementing CBM through ITDS, the data set is the foundation critical to the success of the entire process.

Data Exchange Protocols

International Standards

WCO SAFE Pillar 1 advises Customs administrations to use electronic exchange of information such as EDI and XML standards.

ITDS Best Practices

The United States has established a program that allows traders to submit standard data only once and the system processes and distributes the data to the agencies that have an interest in the transaction.

ITDS Participating Government Agencies (PGAs) include:

- Border Operations Agencies who have responsibility for the import, export, and transit trade processes related to cargo, conveyance and/or crew. Border Operation Agencies sometimes are referred to as admissibility and export control agencies.
- License and Permit Agencies who deal with the recording and maintenance of license and permit information.
- Statistical Agencies have trade promotion responsibilities.
- Trade Promotion Agencies use the web-based secure data portal to facilitate trade by making available basic import and export information, such as rules and regulations, to the trade, service providers, and the public.

Preferred formats for sending documents via the ACE Portal include:

- CSV Comma Separated File
- DOC Microsoft Word Application
- GIF Graphics Interchange Format
- JPG Joint Photographic Group

- PDF Portable Document Format
- PPT Microsoft PowerPoint
- TXT Text Format
- XLS Microsoft Excel

ICNCP To-be Solution Mapping

Initially, data exchange formats can leverage existing ICT capabilities. However, to optimize the system for CBM Exports, technology and security should be developed to allow for the use of a more open system for data exchange, such as XML. This will allow greater participation by the private sector and government agencies. The following chart illustrates the recommended data exchange for exports that is based upon the ITDS and international standards.

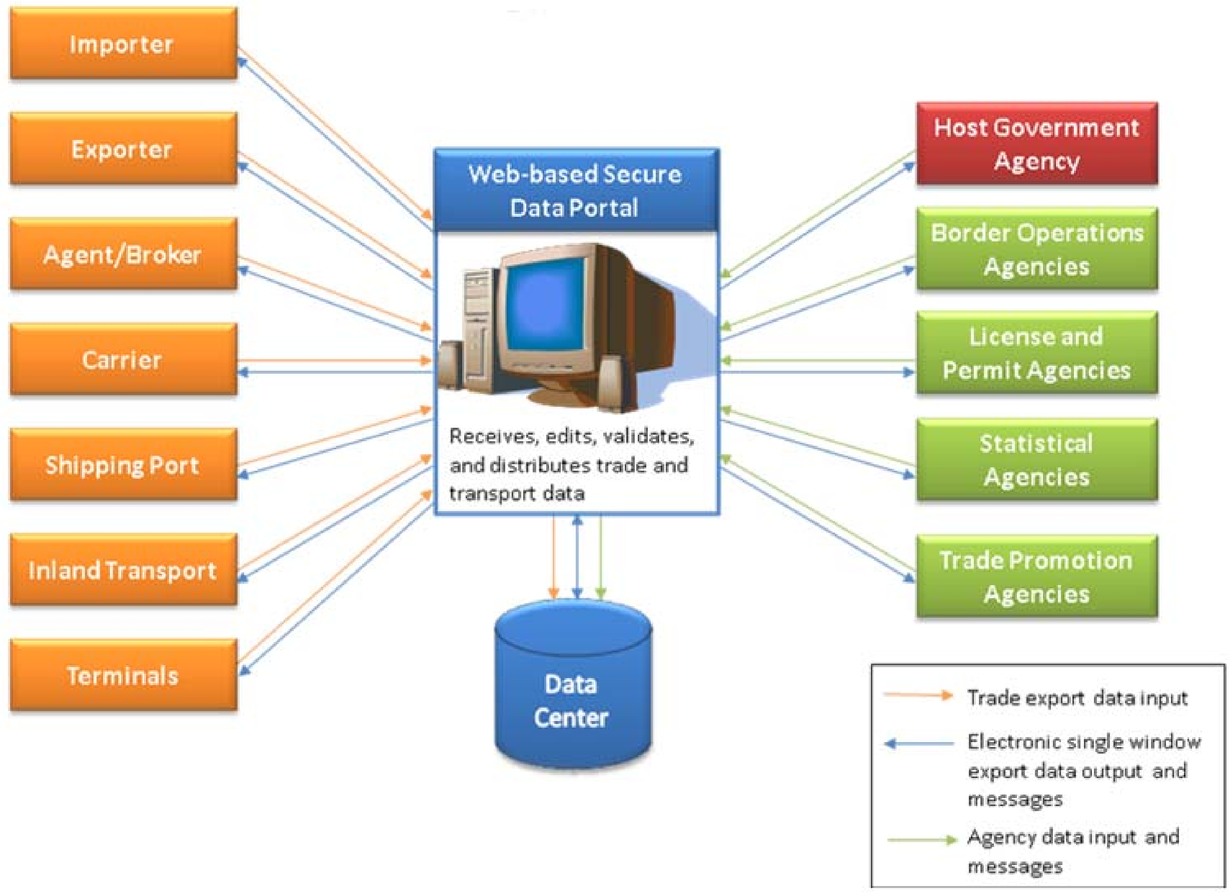


Figure: Recommended data exchange for Exports

Electronic Freight Management (EFM) Initiative

In Phase 1 of the ICNCP project, an analysis was presented of the Electronic Freight Management (EFM) Initiative. Developed by the U.S. Department of Transportation, EFM is an Internet-based solution that provides a common forum for the exchange of freight shipment information between supply chain partners. By allowing each partner access to the information required to facilitate the accomplishment of individual tasks, passage through the supply chain is streamlined by eliminating repetitive data entry with its inherent potential for errors. The key principle at work is the generation of data once which can then be used multiple times by each partner. The supply chain process is streamlined, efficiency is increased, errors are decreased and, most importantly, costs are reduced.

The determination of the As-Is representative supply chain in the Phase 1 review revealed significant opportunities to implement an EFM type solution to improve the processing of goods through the supply chain. The typical supply chain proved to be highly paper-intensive with most partners receiving and rekeying data to conform to their own internal systems and procedures. The primary means of electronic communication involved faxes and emails. Different forms and different formats were used for the same purpose, requiring personnel to be trained in multiple logistics systems. The full potential of computer processing was not being realized as the computer was often used as a printer to generate paper documents for manual processing within the company and for interaction with other supply chain partners. These differences not only existed between supply chain partners but from port to port as well.

Implementation of an EFM type solution holds the promise of eliminating or reducing many of these deficiencies. Brasil has recognized the need to streamline its import/export process and has launched the Porto Sem Papel initiative, an ambitious project to standardize policies and procedures and drastically reduce the amount of paper documentation required to move goods in and out of the country. A key component of the project is to facilitate the communication of data between the various entities involved processing goods through the ports while preserving the security of the data itself.

The features of EFM are consistent with the objectives of the Porto Sem Papel initiative. While initial implementation of Porto Sem Papel has recently begun, full implementation will be phased in gradually. An EFM type solution may be implemented by individual supply chains to facilitate a smooth transition to Porto Sem Papel. The features of EFM may also be helpful to ensure similar components of Porto Sem Papel are founded in best practices proven by practical industry experience. The following sections outline the steps for implementing an intelligent logistics network solution using industry best practices developed by the EFM initiative.

1. Scope Definition/ Needs Assessment

To ensure the solution meets the needs of all supply chain partners, it is important that the scope of each partner's role be clearly defined and the processes used by each are clearly mapped. In short, the solution must accommodate the needs of the partners rather than adapting the process to accommodate a rigid, inflexible solution. Each supply chain partner has a role within the supply chain that distinguishes it from other partners. Each partner should clearly define that role to assist in performing a needs assessment.

2. Identify Business Requirements to Be Addressed

It is self-evident that a needs assessment must first identify needs. A review of the business process highlights areas where changes may be beneficial. Summarizing those possibilities in tabular form allows them to be analyzed, prioritized, restructured, or left unchanged. The act of going through the examination by management may alter original impressions and lead to changes not otherwise anticipated. A representative example of such an exercise follows, identifying certain business requirements and how they may be addressed by an EFM type solution.

Business Requirement	How the Business Requirement is Addressed
Provide shipment status information	EFM will demonstrate the ability to link shipments together along the end-to-end supply chain and provide status of these shipments to all interested and authorized parties on a near-real-time basis.
Provide for information security and integrity	EFM will share shipment-related information among partners in a safe and secure environment. Shipment information will be available to authorized users only and authorized users must have the confidence in the system that the information provided is accurate and current.
Provide open source applications based on standards	EFM will be constructed using open source, non-proprietary business applications and processes to the extent possible. Implementation will facilitate ease of entry by participants. It will support the overall EFM objective of reducing barriers to entry for new participants in the supply chain.
Integrate with supply chain partner's legacy systems	EFM will integrate with partner's existing logistics management and business process systems. EFM is not designed to be (or require) a replacement for existing systems. The level of integration will vary among supply chain partners.
Improve the efficiency of the existing supply chains	EFM will improve the efficiency of existing supply chains by: 1) removing unnecessary duplication of data entry throughout the supply chain; 2) providing data sooner to partners to allow them to make better resource management and shipment-related decisions; 3) providing more efficient and robust processes to manage shipment exceptions; and 4) reducing the dwell time of freight that is sitting "idle" waiting on paperwork or information exchanges to occur, or waiting for resources to be dispatched.
Provide a single window for users	EFM will provide "one-stop-shopping" for supply chain partners to access all data related to EFM shipments including

Business Requirement	How the Business Requirement is Addressed
to access all relevant shipment-related information	shipment status, content, and routing information.
Provide for sharing of intermodal shipment-related information	EFM will implement more efficient and timely sharing of shipment-related information between the partners in the deployment test through the implementation of web services and an SOA.
Provide a reliable method of uniquely identifying each transaction for all authorized partners at all times	EFM will provide a process and mechanism for reliably and uniquely identifying each transaction for all authorized supply chain partners. This Unique Consignment Reference (UCR) will be consistent with the World Custom Organization's guidelines for UCR.

3. Map Supply Chain Process Flow

Determining needs requires an understanding of the current supply chain process flow. Mapping that flow will enable each supply chain partner to identify potential bottlenecks and inefficient practices that need attention. To assist in this endeavor, EFM has broken the typical supply down into seven functional areas and provides a template to assess each area. Originally developed by the US Federal Highway Administration as part of the Freight Information Highway architecture, they been updated for EFM as "Use Case Templates" to assist supply chain partners in mapping their business process:

4. Define Current Methodology for Interchange of Operational Data and Documents Between Supply Chain Partners

Completion of the mapping process for each supply chain partner identifies all the actions required to move goods through the supply chain. In some cases, partners will interact with multiple partners performing the same function. For example, a consignor may contract with two or three drayage companies to perform cabotage services and may use multiple ocean carriers for sea transit. The interaction with each partner must be mapped to provide a complete and comprehensive picture of the supply chain process.

5. Determine Which Methods Must Be Replaced or Supplemented by EFM

Completion of the process flow chart and defining the communications methodologies allows the supply chain partner to focus on improving those areas which can contribute to accuracy and efficiency. In the representative chart above, tasks which are performed via telephone and email methodologies include booking the shipment, receiving and confirming the booking, sending and receiving the advance shipping notice (ASN), sending a delivery appointment request, sending and receiving delivery confirmation are all actions involving telephone communication or email messages, or both.

6. Identify Potential Benefits

Each supply chain partner must be able to identify the potential benefits of change in order to make informed decisions about modifications to the supply chain process. In developing EFM, the US DOT has also adapted a computerized assessment tool to be used to identify and quantify the benefits that accrue from technology enhancements to the supply chain. The Freight

Technology Assessment Tool (FTAT) is aimed at decision makers in both the public and private sectors to bring the power of qualitative as well as quantitative analysis to their technology assessment and selection.

7. Identify Possible Barriers to Implementation

The foregoing analysis is not a decision-making tool – it is a tool for the decision-maker to make informed decisions. Ultimately, each supply chain must evaluate the results of the analysis to identify and evaluate possible barriers to implementation of EFM.

Such barriers typically comprise both financial and non-financial considerations. For the former, financial concerns include the costs of:

- **Time –** implementing a change to existing policies and procedures requires an investment in time while a transition is planned and executed. There will be an inevitable overlap, with its inherent duplication and inefficiencies, while the old systems are phased out and new ones phased in.
- **Personnel and training –** conversion to EFM will require that personnel be trained to operate the system during and following implementation. Further, the increased efficiencies following EFM implementation may result in a reduction in personnel requirements, particularly in administrative functions previously involving significant data entry. The perception that personnel layoffs may result could generate resistance from labor. However, retraining and reassignment of already existing resources within the company is a more attractive option that benefits both the company, by retaining a valuable employee, and the individual, by affording opportunities for advancement and skills broadening.
- **IT expenditures –** EFM implementation will incur some IT costs to affect the transition. Partners that depend on outside technical resources may expect to be compensated for time spent creating data links to the project. This may create unplanned project funding issues and contract negotiations. However, EFM is specifically designed to supplement, not replace, existing legacy systems. The software architecture has been developed by US DOT and is made available off-the-shelf without charge to the user. The primary cost will be to design and implement an appropriate interface between the EFM web services and the company's legacy system.

Non-financial costs include intangibles such as morale and perceptions within and without the company. Maximum effectiveness of EFM implementation requires the participation of all partners in the supply chain. Chief concerns here include data security and the protection of proprietary and competitive information from unauthorized disclosure. Any partner who opts out of the program lowers the overall effectiveness of the total system.

8. Assess Company's Current Technology Environment

With IT expenditures as a potential barrier to implementation, each partner must evaluate conversion requirements to accomplish the transition from an IT standpoint. To a degree, much of this depends on whether the company possesses a robust internal IT function, a minimal presence, or none at all, requiring the support of external contractor resources. The sophistication and capabilities of in-house resources must be evaluated against the tasks required for EFM implementation. Small and medium-sized businesses are most likely to have challenges in this area and require outside support.

9. Develop a Concept of Operations

Having defined business requirements, mapped the supply chain flow process, and performed a needs assessment, the supply chain partner is prepared to develop a concept of operations to formalize the implementation of EFM. The design of each partner's concept will follow the overall high-level EFM design with detail characteristics driven by the individual circumstances revealed in the definition stage.

10. Web Based Services for Data Exchange Function

The dominant characteristic of the EFM model is the use of the World Wide Web as the platform for the exchange of data between partners. The use of web services improves data and message transmission and facilitates business transactions from one end of the freight management supply chain to the other. The development of web services requires a significant level of IT expertise generally beyond the capability and financial resources of small and medium businesses.

11. Standardized Message/Language Formats

To ensure national and international communications compatibility, the system must utilize standardized message/language formats. To achieve this level of compatibility, three internationally accepted formats are used: XML, UBL, and UCR.

In EFM, the Extensible Markup Language (XML) format is the foundation for transmitting data using web services. XML is a markup language for documents containing structured information. XML was created so that richly structured documents can be used over the web. The only viable alternatives, HTML and SGML, are not practical for this purpose. XML supports a wide variety of applications and is relatively easy to use in creating documents. It is ideal for data sharing over the Internet and EFM is therefore based on the use of XML standardized messages

12. Data Security

All supply chain partners must have confidence in the collaborative network, assured that the information they input into the system will be safeguarded against unauthorized disclosure. EFM is designed to share shipment-related information among partners in a safe and secure environment. Shipment information will be available to authorized users only and authorized users can have full confidence in the system that the information provided is accurate and current.

13. IT Requirements for Implementation

Once a supply chain owner has decided to implement EFM and has selected one of the implementation models, the details of the design need to be worked out by the IT and operations staff in close coordination with the supply chain partners who will be participating. The EFM Package, available without charge, provides guidelines, checklists, templates, and components that will make EFM implementation easier.

14. Develop Training Program for All Supply Chain Participants

The most innovative and progressive data-sharing system is only as effective as the skills of the people implementing it. A comprehensive training program is necessary to ensure all users are able to realize the maximum benefit of the system. Training must include not only the personnel of the supply chain owner but the personnel of all partners in the supply chain. Training should encompass all aspects of the system with special focus on the web-based interface with each legacy system and the output products generated by EFM, how to input data, how to request data and, most importantly, how to use the data produced.

15. Conduct Test Program

Before final implementation of EFM, an important aspect of the development is to thoroughly test the network and assure that all interfaces, network connections, and partner interactions are working. This includes the testing of end-to-end data flows, output screens, and report generation. This final pre-launch test ensures not only the proper functioning of the system but validates the training of the personnel operating it.

16. Adjust and Modify as Necessary

It is rare for any new system to function perfectly upon implementation. The implementation timetable must provide time to make necessary adjustments and modifications to the system discovered during the test phase. A rush to implementation without fully resolving all issues will prevent the full potential of the system from being realized and result in frustration with the users of the network. It is to be expected that periodic adjustments will also be made to keep abreast of changes and developments in the normal course of business. The adaptability of EFM is a major attribute which facilitates the ability to maintain an up-to-date system that provides for the needs of all supply chain partners.

17. Execute Implementation

The careful and successful completion of the best practices outlined in this summary will result in a system that will improve efficiency, accuracy, and greatly enhance coordination and data-sharing between supply chain partners. It will enable companies to replace paper trails with electronic documentation, freeing personnel resources that were previously bound by labor-intensive tasks such as manual data entry. The resultant simplification will serve to reduce costs in the administration of the supply chain. These benefits accrue not only to the supply chain owner, but all partners in the supply chain.

2.2.2 Cargo Monitoring Mechanisms

Following the events of 9/11, recognition of the vulnerability of the maritime container supply chain to potential acts of terrorism has lead to the increased utilization of several container security technologies both for tracking/ monitoring the location as well as the integrity of the cargo within the maritime container. For the purposes of the ICNCP project, the Technology landscape for the Unisys Team included:

1. Radio Frequency Identification (RFID) technologies

Radio Frequency Identification (RFID) is a generic term for technologies that use radio waves to wirelessly identify some type of object, such as a cargo container, across a distance. RFID systems consist of 2 basic components: a transponder (tag) and a reader (interrogator).
In its most basic form, an RFID system is a simple replacement to a printed label or a barcode. However, the process of linking objects in a logistics chain is much more complex than just a simple label or barcode. In this context, an RFID system is composed not only of transponders and readers, but also a back-end system that adds most of the functionality.

RFID-based security technologies for maritime cargo containers typically require readers to be located at discrete locations on port or terminal property such as at gates or on cranes in order to detect and read the container's RFID tag. Readers are also necessary at any other point such as warehouses or manufacturing facilities where the user would like to read the container. These readers can be handheld or fixed devices. An information network that collects the data being read from the tags and makes it available to users is also a key part of the system.

2. Global Positioning System (GPS)

Global Positioning System (GPS) is a utility primarily owned by the United States Government to provide positioning, navigation and timing services and is available worldwide not only for military environment but also the civilian segment. GPS is made up of three parts: satellites orbiting the Earth; control and monitoring stations on Earth; and the GPS receivers owned by users. GPS satellites broadcast signals from space that are picked up and identified by GPS receivers. Each GPS receiver then provides three-dimensional location (latitude, longitude, and altitude) plus the time. GPS facilitates the automation of the pick-up, transfer, and placement process of containers by tracking them from port entry to exit. With millions of container shipments being placed in port terminals annually, GPS has greatly reduced the number of lost or misdirected containers and lowered associated operation costs.

3. Global System for Mobile Communications (GSM)

GSM, also known as the 2nd Generation (2G) mobile phone system, is a digital cellular phone technology based on TDMA (Time Division Multiple Access) cellular phone channel. Developed in the 1980s, GSM was first deployed in seven European countries in 1992. It operates in the 900 MHz and 1.8 GHz bands in Europe and the 1.9 GHz PCS band in the U.S.

GSM enabled devices use a Subscriber Identity Module (SIM) smart card that contains user account information, becoming immediately programmed after plugging in the SIM card. GSM provides a short messaging service (SMS) that enables text messages up to 160 characters in length to be sent to and from a GSM phone. It also supports data transfer at 9.6 Kbps to packet networks, ISDN and POTS users

4. Security Sensors

In the container security sensors domain, two general forms of security sensors have been the subject of most research, testing and standards efforts - electronic seals or e-seals, and Container Security Devices (CSD).

- **E-seals** are mechanical seals with an RFID capability that is either built-in or attached. These are mounted through the door latch on the outside of a standard ISO container and protect against an intrusion of the container through the container door by detecting tampering with or opening of the e-seal
- **CSD** is typically an internally mounted device that does not seal the container or attach to the outside of the container door. The device does not need to be tampered with or compromised in order to detect an intrusion of the container. CSDs detect a breach of the container through the door but can also provide additional capabilities, through use of use of plugged-in sensors, such as temperature or humidity reading and explosives detection.

5. Biometric systems and intelligent cards

Biometrics systems comprise of methods for uniquely recognizing humans based upon one or more intrinsic physical or behavioral traits. In the maritime logistics domain, biometrics is used as a form of identity access management and access control. It is also used to identify individuals in groups that are under surveillance. Some Biometric systems researched by the Unisys Team include identification technology solutions utilizing fingerprint, face recognition, palm print, hand geometry and iris recognition.

Intelligent Card system is used primarily for access control in the maritime logistics domain. It is a system which enables an authority to control access to areas and resources in a given physical facility or computer-based information system. An access control system, within the field of physical security, is generally seen as the second layer in the security of a physical structure.

6. X-ray equipment and radiation detection equipment

X-ray technology provides the capability to image the contents of containers without having to perform the time-consuming process of unloading a container and physically inspecting its contents. The primary users of X-ray technology in the seaport environment are Customs administrations although ports, terminals and others use the technology as well. Customs administrations have used X-ray technology to support their mission of enforcing Customs regulations and preventing revenue fraud by validating manifest information. They also use the technology to detect the smuggling of contraband and other illicit behavior.

Radiation detection equipment in its simplest definition includes radiation energy in motion in the form of waves or streams of particles. Sound, infrared and visible light, as well as ultraviolet radiation are familiar forms of non-ionizing radiation. Ionizing radiation from radioactive elements such as uranium is naturally emitted from basic materials in the Earth such as from rocks and soil. The radiation emitted by these naturally occurring radioactive materials (NORM) is often called "background radiation." In efforts to detect threatening material or special nuclear material (SNM) such as highly enriched uranium (HEU), it is this ionizing radiation that Radiation Portal Monitors and other devices are designed to detect.

7. Networks and communications systems

Network and communication systems are the backbone of the logistics operations systems. They support the basic interaction between all the stakeholders involved as well as provide the mechanism for sharing data from various systems deployed within the logistics operations. The Unisys Team looked at various network and communication systems for the monitoring and collection of information along the port logistics chain for the purposes of the ICNCP project.

8. Monitoring Software applications

Cargo Monitoring Software applications are sophisticated order and freight tracking software solutions that enable individual orders to be tracked from the time the order is placed until the order is received by the consignee. Specifically for maritime cargo tracking, Cargo Monitoring Software application is suitable for international logistics operations and allows the integration of order management processes into Shipper/ Exporter and freight forwarders business processes. For the ICNCP project, this functionality is provided by the tracking and tracing of containers via simple check-in, check-out technology solutions

2.2.3 Technology Analysis

For the purposes of the ICNCP project, the Unisys team confirmed the requirements of the container monitoring mechanisms with SEP and initiated research on analysis of RFID technologies. The Unisys Team documented and analyzed the RFID solutions based on:

Technology Type

RFID transponders or tags are categorized as either active or passive.

- **Passive RFID tags** draw power from the electromagnetic field created by the reader and use it to power the microchip's circuits, allowing it to the tag to send a signal back to the reader, which converts the radio signal to digital data. Passive tags have no battery.
- **Active RFID tags** have a transmitter and their own power source, typically a battery. The power source is used to run the microchip's circuitry and to broadcast a signal to a reader. An actively powered transponder can continuously broadcast its signal with the need of nearby reader to power it.

Usage

Due to their higher cost, active tags are typically used for tracking high-value goods that need to be scanned over long ranges. Their batteries are also necessary to power other capabilities that may be part of the tag such as sensors that detect door openings, light or perform other functions. For this reason, most but not all on-container security solutions are based on active RFID technology.

Frequency
RFID tags and readers operate at radio frequencies typically determined by their application and user requirements. RFID systems use many different frequencies ranging:

- **Low-frequency** (around 125 KHz) are passive and rely on inductive coupling to transmit data back to a reader. This frequency is more effective at reading objects near and around metal or liquids. Significant drawbacks to low frequency are the slow data rate, which makes it difficult to read many objects simultaneously, and the relatively short read range (typically less than 1 meter). Applications that do not require fast read rates such as vehicle immobilizers and access control are typical applications of this band.
- **High-frequency** (13.56 MHz) tags are passive. A benefit of high frequency is that it is universally accessible, with countless devices currently operating at 13.56 MHz. The major applications in this band are smartcards, which are used for transportation and point-of-sale transactions. Operation in the high frequency band provides more bandwidth for faster tracking of multiple tags.
- **Ultra-high-frequency** (860-960 MHz) is passive and is a superior solution for supply-chain management applications. Passive transponders operating at 915 MHz are readable as they pass through a loading dock door. The higher frequency also provides a faster data rate, allowing simultaneous reads to occur more quickly. Tags operating in this frequency band offer a great compromise among many variables, including tag cost, read range and speed, and the ability to function near metal.
- **Microwave** (2.45 or 5.8 GHz) offer the fastest theoretical read and transmission rates of all frequency bands. However, due to the higher frequency, microwave tags are more susceptible to interference and are least effective near and around liquids and metals. Applications where these tags are used include baggage tracking and supply-chain management. Read range also tends to be slightly lower in the microwave band than in UHF. For this reason, there are many active tag technologies that transmit in the microwave band to take advantage of higher read rates while using batteries to produce greater read range for the tags.

Due to the characteristics of the supply chain environment, RFID tags for securing maritime cargo containers has primarily been developed at the 433Mhz, 860-960Mhz, and 2.4Ghz frequencies.

Functionality
High-frequency tags work better on objects made of metal and have a maximum read range of about three feet (1 meter). UHF frequencies typically offer better range and can transfer data faster than low- and high-frequencies. But they use more power and are less likely to pass through materials. They also tend to be more "directed" and thus require a clear line-of-sight between the tag and reader.

There are 3 basic types of functionality for data storage:

- **Read-only** tags are programmed with unique ID numbers. These codes are fixed and unique for a given lot of tags produced. To relate read-only tags to additional data such as a model or serial number, an external database is required. While considering read-only tags, it is important to remember that data storage is not limited just to tag memory. A database can store virtually endless information when compared to a tag's paltry memory. Current auto identification systems are read-only, making the still formidable transition to RFID less daunting.

- **Write-once or OTP (One-Time Programmable)** tag allows users to set the memory to include any information they choose. Once the memory has been set, the tag operates in read-only mode. Applications for this technology include programming tags to individually identify an entire lot of identical items as they come off the assembly line.
- **Read-write tags** offer the ability to read and write to the tag over its entire lifetime. Some applications include tracking stages during work-in-process or identifying an asset as it changes ownership. Read-write tags offer the most flexibility for an RFID system. The non-volatile memory required for a read-write tag is slightly greater than comparable read-only memory. For read-write tags, there is a slight, but unavoidable delay in the time it takes to read a tag and then refer to an external database for detailed information. When infrastructure is not always readily available, read-write tags tend to be used.

Reader Infrastructure

Readers identify objects by communicating with the tags using a wireless RF link. Certain tag/reader combinations offer read ranges in excess of 100 feet. In some applications, readers can also act as "writers" capable of storing data on a tag. Readers come in 2 broad form factors:

- **Handheld** readers are more for mobile applications and are more expensive than fixed readers with similar functionality. They are also large due to their rechargeable on-board battery
- **Fixed**, are typically installed at points of entry and exit, and read all tags entering their fields. When tracking moving assets such as cargo containers, fixed readers are the most effective solution.

Technology Standards

The following standards and groups are driving standards for RFID solutions for Maritime freight containers

- **ISO 18185**, the standard for electronic seals, which had been under consideration for over 7 years, was finally approved in April 2007. The catalyst that led to this adoption was discussion within the US Department of Homeland Security to mandate that all containers inbound to the United States be sealed and inspected. ISO 18185 requires that the electronic seals have the same minimum mechanical characteristics that are defined within ISO 17712. The mechanical characteristics prevent access to the containers. The electronics will then transmit an alert if anyone tampers with intrudes into a container. The standard will be for active tags, with varying frequencies such as 433 MHz or 2.45 GHz.
- **ISO TC 1/SC 31**, Automatic Identification and Data Capture (AIDC) Technique working on RFID for Item Management with ISO/ IEC 18000 and 18001 for the interoperability of data across frequencies throughout the supply chain
- **ISO TC 104/SC 4**, Identification and Communication focused on identifying and presenting information for freight containers

- **European Telecommunications Standard Institute (ETSI)** pertains to the electromagnetic compatibility and radio frequencies abilities of RFID tags and readers, particularly for short range devices
- **American National Standard Institute (ANSI)**, defines a single application program interface (API), which will serve as a unifying platform shared by all compliant RFID implementations and provide a common interface to application programs.

Cost

The range of capabilities and different types of e-seals and CSDs leads to a wide range in pricing for these devices. Additionally, a variety of business models including having shippers purchase the devices, lease the devices or charge a pay per trip fee can complicate pricing.

- **Device Cost** - Technology vendors have referenced disposable e-seal pricing of under $25 per e-seal and approximately $250 for a container security device in a mature market. Considered over the useful life of a purchased reusable CSD and factoring in the per trip cost of arming the device, an average of $15-25 per shipment has been reported. These costs are exclusive of the infrastructure required to arm/lock the RFID device and to read the devices at various points in the supply chain.
- **Reader Cost -** The cost of a fixed reader can range between $2,000 and $3,500.
- **Installation Cost –** The installation cost at a typical gate are estimated at between $25,000 and $55,000 by some technology vendors. This does not include any special construction or permitting required supporting the implementation
- **Software Cost –** This is the cost of the software needed to integrate and communicate the information collected from the different sensors or cargo monitoring mechanisms
- **Maintenance Cost** - The maintenance/ service costs includes hours needed for break, fix and maintain Intelligent Cargo project infrastructure such as readers, wiring, cabling, etc.

It is important to note that the business model of some RFID container security device vendors includes providing and installing fixed reader infrastructure free of charge in ports and terminals as they seek to expand their footprint and establish a large network of coverage.

Data Encryption

Data encryption refers to the process of transforming electronic information into a scrambled form that can only be read by someone who knows how to translate the code. Encryption is important in the business world because it is the easiest and most practical method of protecting data that is stored, processed, or transmitted electronically. It is vital to electronic commerce, for example, because it allows merchants to protect customers' credit card numbers and personal information from computer hackers or competitors. It is also commonly used to protect legal contracts, sensitive documents, and personal messages that are sent over the Internet. Without encryption, this information could be intercepted and altered or misused by outsiders. In addition, encryption is used to scramble sensitive information that is stored on business computer networks, and to create digital signatures to authenticate e-mail and other types of messages sent between businesses.

There are two main types of data encryption systems:

- **Symmetric Key Encryption:** Both the sender and the recipient of the data hold the same key for translation. This single key is used both to code and decode information that is exchanged between the two parties. Since the same key is used to encrypt and decrypt messages, the parties involved must exchange the key secretly and keep it secure from outsiders. Private key encryption systems are usually faster than other types, but they can be cumbersome when more than two parties need to exchange information.
- **Public Key Encryption**: This type of system involves two separate keys: a public key for encoding information; and a private key for decoding information. The public key can be held and used by any number of individuals and businesses, whereas only one party holds the private key. This system is particularly useful in electronic commerce, where the merchant holds the private key and all customers have access to the public key. The public key can be posted on a Web page or stored in an easily accessible key repository. Public key encryption systems are widely available on the Internet and are heavily utilized by large companies like Lotus and Microsoft.

In summary, shown below is a basic analysis of Active and Passive RFID technology:

Data	Passive RFID Technology	Active RFID Technology
Read Range	• Up to 40 feet (fixed readers) • Up to 20 feet (handheld readers)	Up to 300 feet or more
Power	No power source	Battery powered
Tag Life	Up to 10 years depending upon the environment the tag is in	3-8 years depending upon the tag broadcast rate
Tag Costs	$.10-4.00 or more depending upon quantity, durability, and form-factor	$15-50 depending upon quantity, options (motion sensor, tamper detection, temperature sensor), and form-factor
Ideal Use	For inventorying assets using handheld RFID readers (daily, weekly, monthly quarterly, annually). Can also be used with fixed RFID readers to track the movement of assets as long as security is not a requirement.	For use with fixed RFID readers to perform real-time asset monitoring at choke-points or within zones. Typically necessary when security is a requirement.
Readers	Typically lower cost	Typically higher cost

To-Be Solution Cargo Monitoring Technology Solutions
Taking into consideration the To-Be Solution requirements, the Unisys Team has profiled the following Cargo Monitoring Mechanism solutions:

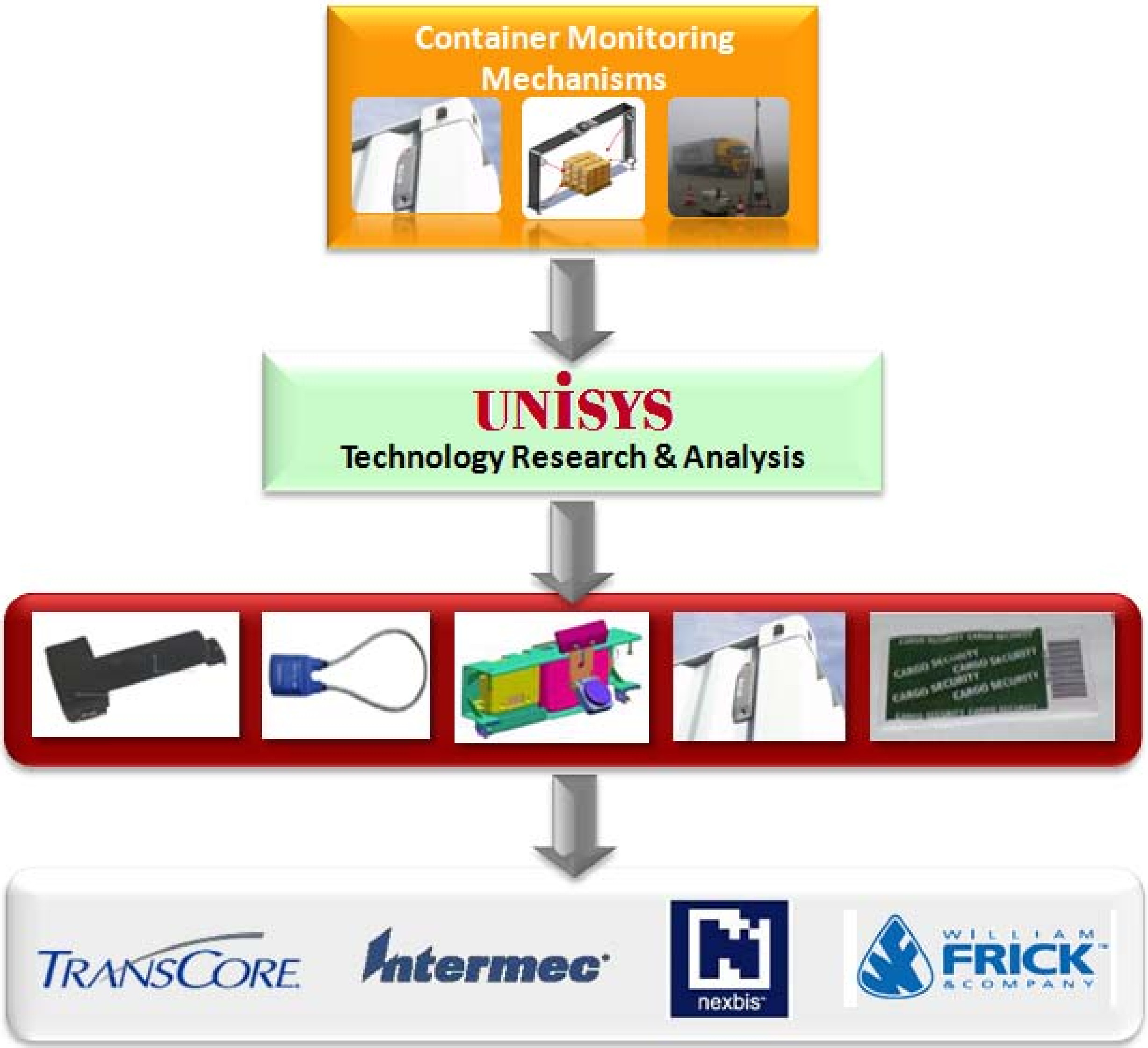


Figure: Unisys To-Be Solution Analysis Methodology

Each of these solutions will be described in more detail in the section below.

To-Be Solution Option #1

No.	Focus Area	Details	
1.	Type of Solution	Cargo and Container Tracking	
2.	Solution provider Name	William Frick & Company (http://www.fricknet.com/)	
3.	Address	**William Frick & Company** 2600 Commerce Drive Libertyville, IL 60048	
4.	Point of Contact	Name	Brent Howell
		Email	Brent.Howell@fricknet.com
		Phone #	+1 (847) 918-2211 Office +1 (847) 975-8982 Cell
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	No	
7.	Local representative in Brasil	In-progress	
8.	Local representative Name	TBD	
9.	Local representative Contact Information	TBD	
10.	Solution Description	Container Movement Passive RFID Tracking	

Solution Functionality
Frick RFID Passive Tag tracking solution consists of the following components:

Component	Description & Purpose	Picture
Passive RFID Label	Attached to a container that is able to capture signals in 860 MHz to 960 MHz band and capable to store up to 96 bits and working range on metal approximately 3 feet and other materials up to 30 feet.	 **Passive RFID Tag SM-22**

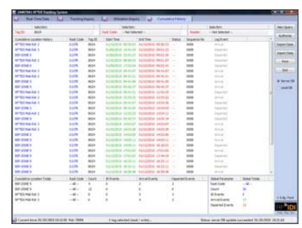
Component	Description & Purpose	Picture
Antenna	Mounted at a location that broadcasts and captures signals in the 860 MHz to 960 MHz band	 **Impinj's RFID antennas**
Reader	Receives signal from antenna and decode data to feed system	 **Multiprotocol Reader Encompass 5**
Control System	Needed to view status and collect tag information. System receives decoded information from reader and updates container historical data.	 **Terminal Tracking Software**

Table: Frick Solution Components

Overall

The combination of Frick Passive RFID solution consisting of a RFID label, antenna (for signal broadcasting and reception from) and a reader is capable of tracking containerized shipments starting from the empty container pick up process all the way to the discharge terminal operations control point. This solution with help in the tracking of containerized assets and allow users to review and collect the tracking history of the export container automatically within a single database, providing visibility and improving logistics chain security.

Cargo Monitoring Mechanism #2

No.	Focus Area	Details	
1.	Type of Solution	Cargo and Container Tracking	
2.	Solution provider Name	Transcore Ltd (a unit of Roper Industries) (http://www.transcore.com/)	
3.	Address	Transcore Tracking & Communications 11000 SW Stratus Street Beaverton, Oregon 97008, USA	
4.	Point of Contact	Name	Scott Brosi
		Email	scott.brosi@transcore.com
		Phone #	+1 (972) 567-1693
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	Yes	
7.	Local representative in Brasil	Yes – In negotiation	
8.	Local representative Name	TBD	
9.	Local representative Contact Information	TBD	
10.	Solution Description	Container Movement Passive RFID Tracking	

Solution Description
Transcore RFID Passive Tag tracking solution consists of the following components:

Component	Description & Purpose	Picture
Passive RFID Tag	Attached to a container that is able to capture signals in 902 MHz to 928 MHz band and capable to store up to 10 alphanumeric characters of data (60 bits). It has a working range between 1.5 to 3 m (5 to 10 ft)	 **Passive RFID Tag AT5112**

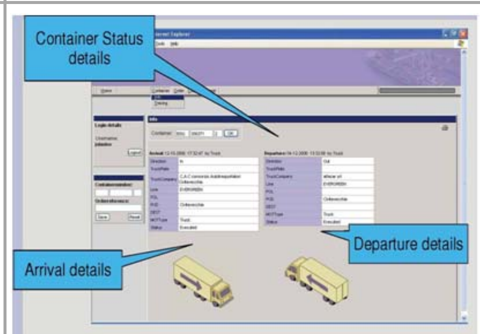
Component	Description & Purpose	Picture
Antenna	Mounted at a location that broadcasts and captures signals in the 902 MHz to 928 MHz band	 **Universal Toll Weatherproof Antenna AA3152**
Reader	Receives signal from antenna and decode data to feed system	 **Multiprotocol Reader Encompass 5**
Control System	Needed to view status and collect tag information. System receives decoded information from reader and updates container historical data.	 **Terminal Tracking Software**

Table: Transcore Solution Components

Overall

The combination of Transcore Passive RFID solution consisting of a tag, antenna (for signal broadcasting and reception) and a reader is capable of tracking containerized shipments starting from the empty container pick up process all the way to the discharge terminal operations control point. This solution with help in the tracking of containerized assets and allow users to review and collect the tracking history of the export container automatically within a single database, providing visibility and improving logistics chain security. Shown below is a typical set up of the Transcore Passive RFID solution.

Cargo Monitoring Mechanism # 3

No.	Focus Area	Details	
1.	Type of Solution	Cargo and Container Tracking	
2.	Solution provider Name	Intermec , Ltd (http://www.intermec.com/)	
3.	Address	Intermec Worldwide Headquarters 6001 36th Avenue West Everett, WA, 98203-1264, USA	
4.	Point of Contact	Name	Clauber Rocha
		Email	clauber.rocha@intermec.com
		Phone #	+1 (425) 348-2600
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	Yes	
7.	Local representative in Brasil	Intermec South America Ltda. Rua Samuel Morse, 120 - 9° andar - Edifício Itaju Brooklin Novo – São Paulo – SP – Brasil	
8.	Local representative Name	Bianca Nascimento	
9.	Local representative Contact Information	+55 (11) 3711-6772	
10.	Solution Description	Intermec Passive RFID Tracking	

Solution Description
Intermec RFID Passive Tag tracking solution consists of the following components:

Component	Description & Purpose	Picture
Ruggedized Passive RFID Tag	• EPCglobal Gen 2/ISO 18000-6C: 860 MHz to 960 MHz • 512-bit-on-chip user memory • Typically used in Automotive containers Large metal containers, Postal roll cages and Metal drums	 **Passive RFID Tag (IT67)**

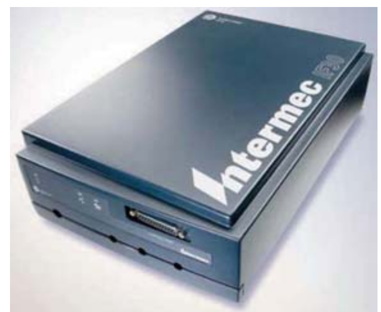
Component	Description & Purpose	Picture
Antenna	Mounted at a location that broadcasts and captures signals in the 902 MHz to 928 MHz band	 **Antenna IA33A**
Reader	Receives signal from antenna and decode data to feed system	 **Multiprotocol Reader IF30**
Control System	Needed to view status and collect tag information. System receives decoded information from reader and updates container historical data.	 **Terminal Tracking Software**

Table: Intermec Solution Components

Overall

Intermec tracking solution is a combination of a ruggedized passive RFID with an antenna, a data reader and management software with relatively easy deployment within terminals, specifically at the gates. As the tag is capable to store information and the reader is re-writing capable, any time a record for the assigned container is required to be updated, an operator feed the SmartSystem Foundation with data, which then send the updates to the reader whose encode the information and transmit it to the tag, updating or re-writing the previously stored record. Beside of data transmission to the passive RFID tags, information gathered from the device, as well as the updates sent to the reader, can also be stored in servers and shared as convenient.

Cargo Monitoring Mechanism # 4

No.	Focus Area	Details	
1.	Type of Solution	Cargo and Container Tracking	
2.	Solution provider Name	Nexbis Ltd. (http://www.nexbis.com/)	
3.	Address	Nexbis USA Inc. 16192 Coastal Highway, Lewes, Delaware, 19958, USA	
4.	Point of Contact	Name	Bryan Dilella
		Email	bryan.dilella@ici-consulting.com
		Phone #	+1 (703) 915-1620
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	No	
7.	Local representative in Brasil	No	
8.	Local representative Name	N/A	
9.	Local representative Contact Information	N/A	
10.	Solution Description	The NexTrack Cargo Container Security and Authentication Solution (NexTrack), enables real-time shipping and customs information via a 2-D barcode technology that references a secured centralized database.	

Solution Description
The NexTrack Container Cargo Tracking and Authentication Solution is composed by:

Component	Description & Purpose	Picture
2-D Barcode	Label printed with 2-D barcode stamped on a container	**2-D barcode printed in a label**

Component	Description & Purpose	Picture
2-D barcode Reader	An image capturing equipment (both stand alone cameras and camera enabled mobile phones)	 **Camera**
Software for information processing	Needed to view status and collect tag information. System receives decoded information from devices and updates container historical data.	 **Terminal Tracking Software**

Table: NexTrack solution components

Overall
The solution provided by Nexbis for container tracking, so called NexTrack, is based on image capturing by either a CCTV surveillance camera, integrated with Nexbis software, and cell phone device with image recording capability, also with Nexbis software installed on its platform.Barcode recognition is a very simple process in which a truck with a container carrying (or not) cargo arrives in a Terminal gate, cross an Infra-Red line (or another trigger mechanism) to engage camera to start scanning the container surface. Once the scanning process recognizes the existence of the barcode, usually 5 seconds of scanning is sufficient, the image is then transmitted to a computer with NexTrack software for processing and update of container history with gate in or gate out time.

2.2.4 Systems Integration and Information Exchange

Integration of maritime logistic systems is needed to process export containerized cargo more efficiently and securely from Brasil. Exchange of key logistics chain information to all the relevant stakeholders and government agencies is a goal for processing cargo in a secure manner via Sistema Porto Sem Papel. As part of the ICNCP To-Be Solution design, the Unisys Team has assimilated all the currently available logistics chain data from the Container Demand to Discharge/ Export Declaration from Brasil. This Systems Integration and Information Exchange is the third component of the ICNCP To-Be Solution design.

The ICNCP Application Programmable Interface (API) will allow the integration and assimilation of data from several disparate data sources and systems that exist today or are planned to be deployed in the short term (3-6 months). The goals of the Systems Integration and Information Exchange component is to enhance the data model of Sistema Porto Sem Papel, enabling a single and unique view of the entire export logistics chain process. All of the data collected and mapped within the ICNCP API will be transmitted via standardized XML messages via a secure protocol to the Sistema Porto Sem Papel.

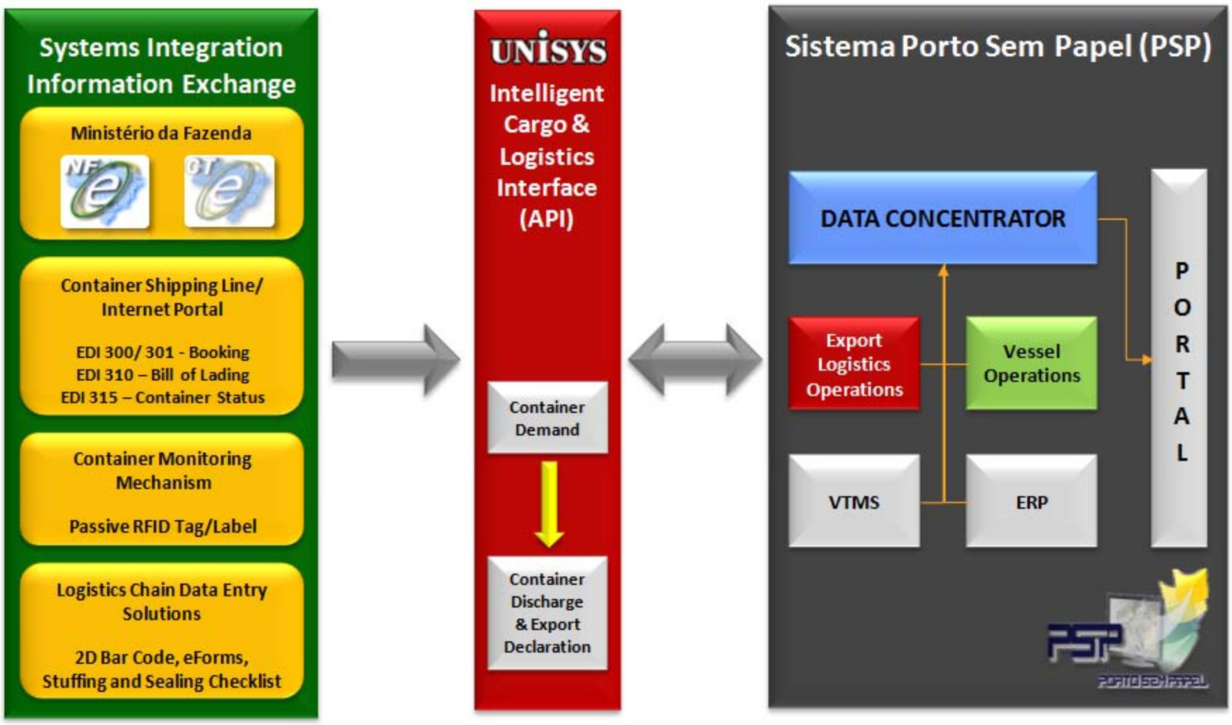


Figure: ICNCP Systems Integration & Master Data Set components

In developing ICNCP normalized data model (ICNCP Master Data Set), the Unisys Team researched and analyzed the different systems and technology solutions documented below utilizing the following design requirements:

- Solutions/ systems should support a deployment of the ICNCP To-Be Solution in a short timeframe
- Integration of disparate data sources should include currently available systems
- Usage of technology should be in alignment with port, state and federal laws
- There should be a balance between business processes and information exchange
- Technology should used as an enabler to collect and share information
- All data collected needs to build towards enhancing the existing PSP data model

Nota Fiscal Eletrônica (NF-e)

The Nota Fiscal Eletrônica is a digital document that proves the sale of goods or provision of services between parties. It exists in the digital environment and, is issued and stored electronically in order to document for tax purposes. Legal validity is guaranteed by digital signature of the sender (guarantee of authorship and integrity) and the receipt by the Treasury. The NF-e will enhance the ICNCP Master Data Set by providing information such as who is the vendor, who is the customer, what kind of goods or services are being acquired and if available, who is the entity transporting the goods. Additional information of the NF-e and an example of a DANFE is available in Appendices 8.3 and 8.4

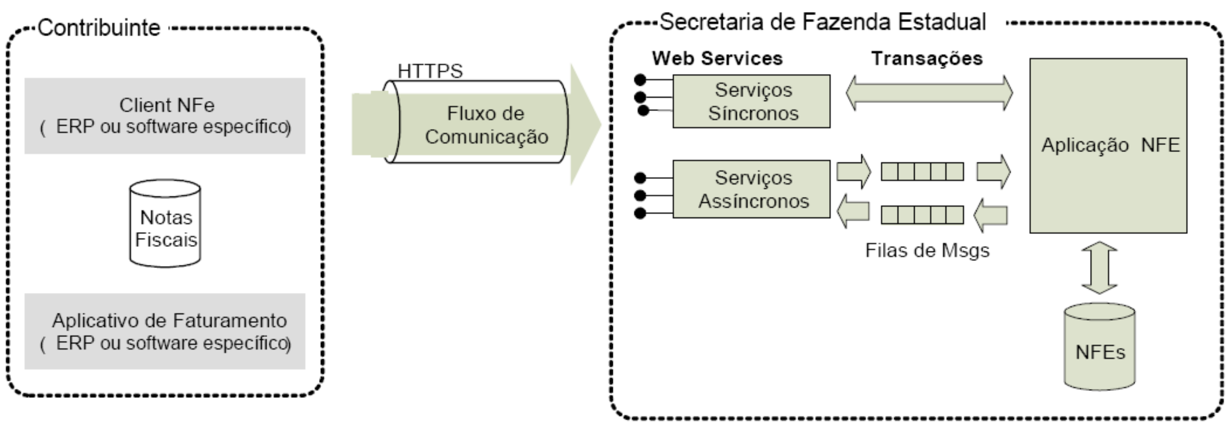


Figure: NF-e Data Flow

Conhecimento de Transporte Eletrônico (CT-e)

The Conhecimento de Transporte Eletrônico is a digital document that is issued and stored electronically to document information related to the transportation of cargo carried by all modes (Road, Air, Rail, Waterway and Pipeline), for tax purposes,. Legal validity is guaranteed by digital signature of the sender (guarantee of authorship and integrity) and the receipt by the Treasury. The CT-e will enhance the ICNCP Master Data Set by providing information about the cargo being transported such as the transport company, transport mode, transport carrier information, product value, taxes, quantity purchased, delivery forecast, etc. Additional information of the CT-e and an example of a DACTE is available in Appendices 8.3 and 8.4

Container Booking Request Message (EDI 300)
The Container Booking Request Message is generated by the Container Shipping Line or Internet portals to the Shipper/ Exporter or representative. It contains information of the order that is made by the Shipper/exporter to the container shipping line for reservation of space on a vessel for export of cargo from Brasil. The Booking Request message can be ether in EDIFACT or ANSI X12 formats. The Container Booking Request Message will enhance the ICNCP Master Data Set by providing more visibility into the number of containers being booked by Shippers/ exporters. Shown below is the schema design view of Booking Request message.

Container Booking Confirmation Message (EDI 301)
The Container Booking Confirmation Message is generated by the Container Shipping Line or Internet portals to the Shipper/ Exporter or representative. It contains information of the acknowledgement of the order made by the Shipper/exporter to the container shipping line and contains information of the space allocated on a vessel for export of cargo from Brasil. The Booking Confirmation message can be ether in EDIFACT or ANSI X12 formats. The Container Booking Confirmation Message will enhance the ICNCP Master Data Set by providing more visibility into the number of containers being booked by Shippers/ exporters. Shown below is the schema design view of Booking Confirmation message.

Bill of Lading Message (EDI 310)
Bill of lading is a contract to carry the goods to the said destination based on which seller can claim consideration and buyer can take delivery of the goods. The Bill of Lading message is a message with information of the official document prepared by the carrier duly accepting the goods for shipment. It contains cargo information such as item, quantity, value, vessel details, date, port, consigner, consignee etc. The Bill of Lading message can be ether in EDIFACT or ANSI X12 formats. The Container Booking Confirmation Message will enhance the ICNCP Master Data Set by providing more visibility into the Bills of Lading and source information provided by the Container Shipping Line to the Shippers/ exporters and government agencies. Shown below is the schema design view of Bill of Lading message.

Container Status Message (EDI 315)
The Container Status message is a message with the notification of the change of status of an export container. It contains cargo information such as container number, quantity, vessel details, date, port, etc. The Container Status message can be ether in EDIFACT or ANSI X12 formats. The Container Status Message will enhance the ICNCP Master Data Set by informing the status change of a container when it enters and leaves the terminal gate-in/gate-out or is loaded onto the vessel for export, hence providing more visibility to the Shippers/ exporters and government agencies. Shown below is the schema design view of Container Status message.

Cargo Monitoring Mechanism – RFID (Radio-Frequency Identification)
The RFID solution is a mechanism to track export containers. The RFID solution will be used to monitor RFID tag enabled containers via a reader infrastructure placed at key Gate-In and Gate-Out locations. This information will be captured in the ICNCP API. The RFID message will be in XML format. The Container Status Message will enhance the ICNCP Master Data Set by

informing the status of a container when it enters and leaves the terminal gate-in/gate-out providing more visibility to the Shippers/ exporters and government agencies.

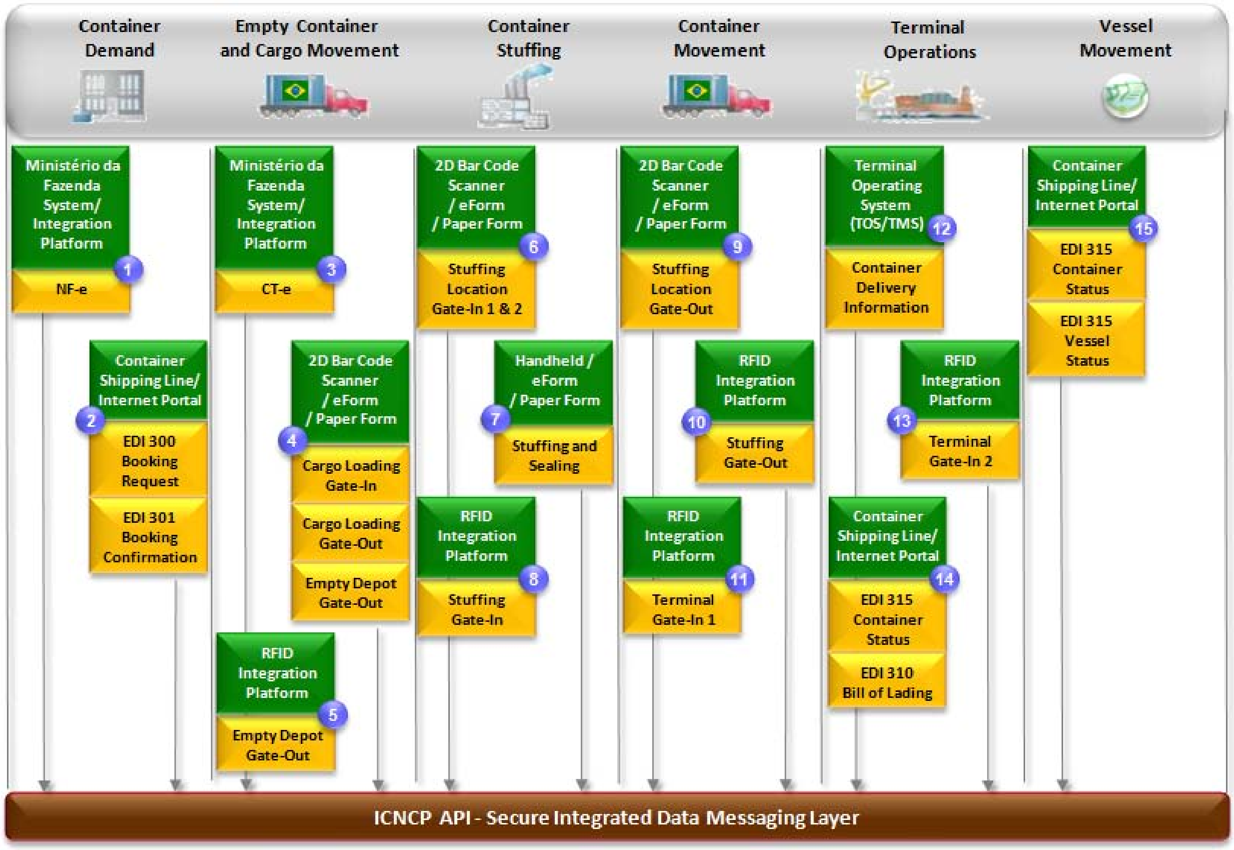
Logistics Chain Data Entry Solutions - 2D Bar code scanner
In 2D Bar code solution will be used as a mechanism to capture key check-in and check-out information of the cargo, truck and truck driver at locations within the Export Logistics Chain. This information will be captured in the ICNCP API via 2D bar code scanners and the message will be in XML format. The 2D Bar Code Scanner Message will enhance the ICNCP Master Data Set by informing the status of a container when it enters and leaves the terminal gate-in/gate-out providing more visibility to the Shippers/ exporters and government agencies.

Logistics Chain Data Entry Solutions - Container Stuffing and Sealing
The Container Stuffing and Sealing message is a dataset that includes all the information captured during the export container stuffing and sealing process. The container and cargo data will be captured by way of:

- Online method using a handheld device
- Semi-online method using a computer based electronic form
- Offline method using a paper based form

Stuffing and Sealing message contains cargo information such as container number, quantity, seal numbers, etc. The Container Status message will be XML format and will be integrated with the ICNCP API. The Container Stuffing and Sealing Message will enhance the ICNCP Master Data Set by collecting container and cargo information providing more visibility to the Shippers/ exporters and government agencies.

Overall
With the collection of data across the Export Logistics Chain via an integrated Systems Integration and Information Exchange approach, the ICNCP To-Be Solution is able to collect the additional data, as shown below



With the assimilation of data available from Container Demand to Vessel Movement, key logistics data will be collected and stored into the ICNCP API and then sent to Sistema Port Sem Papel Logistics Module thereby providing visibility of the entire Export Logistics Chain via a true Single Window in a secure manner.

2.2.5 To-Be Logistics Chain

This section provides a description of the major processes of the To-Be Export Logistics Chain from a control point perspective. The Unisys Team mapped and defined a To-Be Export Logistics Chain in an intelligent cargo and network environment the To-Be Logistics Chain by:

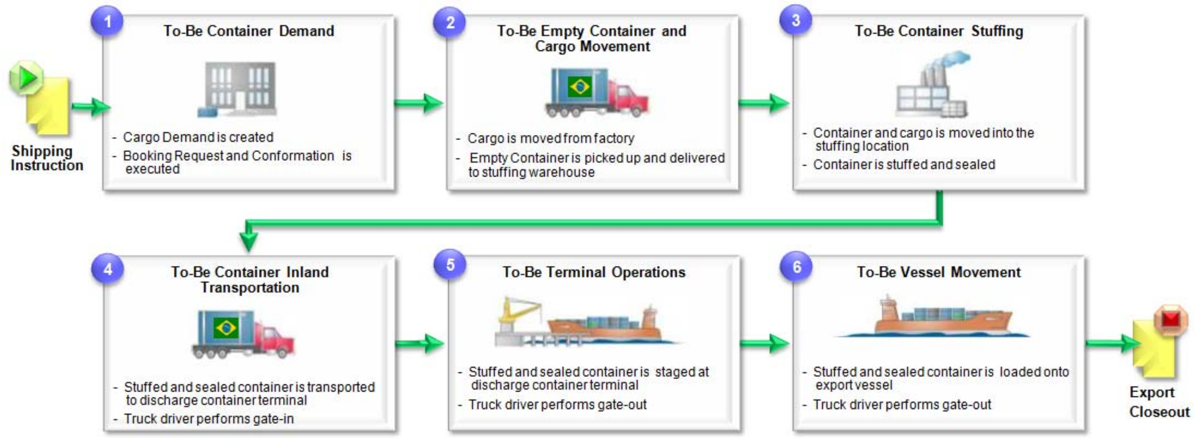
- Documenting container based technology solutions
- Identifying new and modified processes that enhance cargo visibility and security
- Enhancing overall information sharing capabilities to logistics chain participants

The Unisys Team has documented the To-Be Logistics Chain into the following Six (6) discreet business processes / control points:

- To-Be Container Demand
- To-Be Empty Container and Cargo Movement
- To-Be Container Stuffing
- To-Be Container Inland Transportation
- To-Be Terminal Operations
- To-Be Vessel Movement

Due to the nature of the export logistics chain, each discreet process involved at least two business partners. As a result, Unisys organized the To-Be Export Logistics Chain into six discreet processes mentioned above. This organization enabled Unisys to view and assess the export logistics chain from an individual logistics chain partner and business process/ information/ documentation or control point perspective.

A high level overview of the sequence of To-Be Export Logistics Chain is shown below.



The section below documents the To-Be Solution for the ICNCP project, broken-down into step-by-step business processes technologies and information exchange protocols Identify that will enhance logistics chain visibility, collaboration and security.

Additional detail of each of these control points is documented in the section below

To-Be Container Demand

Description

To-Be Container Demand process initiates the cargo movement activities for the export logistics chain involving the exportation of containerized cargo from Brasil. Within the scope of the ICNCP project, it serves as the starting control point of the To-Be solution activities.

For the purposes of the ICNCP project, the To-Be Container Demand control point will:

- **Start** with the booking request made by Shipper/ Exporter
- **End** with the receipt of the booking confirmation in the To-Be Solution and delivery of shipping instructions from Shipper/Exporter to all relevant entities

To-Be Business Process Flow

Illustrated below is the To-Be Container Demand business process flow.

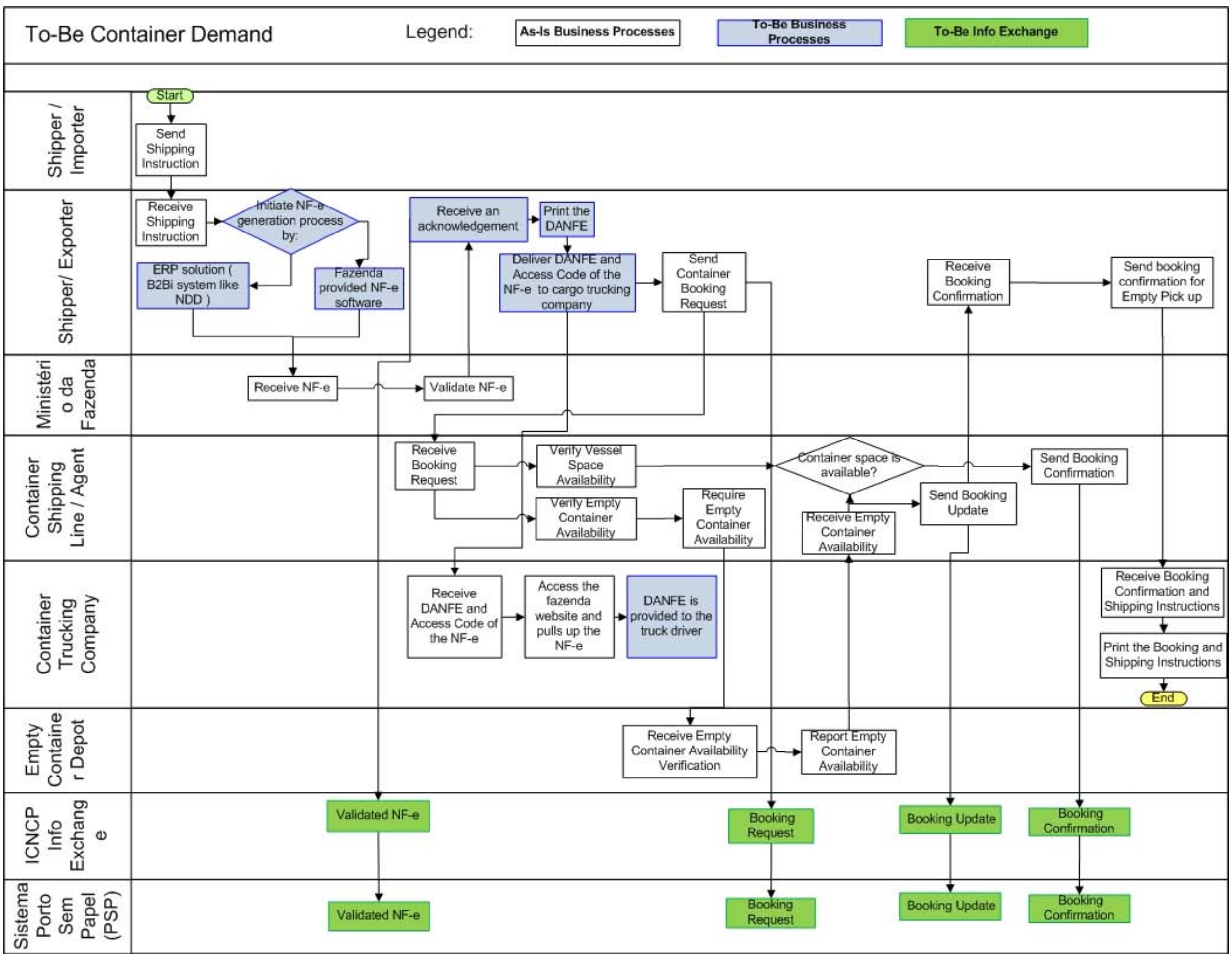


Figure – To-Be Container Demand business process flow

To-Be Empty Container and Cargo Movement

Description

Empty Container and Cargo Movement is the process involving the inland transport of the:

- Empty export container from the Empty Container Depot to the Container Stuffing location
- Cargo from the Manufacturing facility to the Container Stuffing location.

For the purposes of the ICNCP project;
Empty Container control point will:

- **Start** with empty container request from the Container Shipping Line
- **End** with the delivery of the empty container to the Container Stuffing location.

Cargo Movement control point will:

- **Start** with exporter's cargo shipping request to the Cargo Trucking company
- **End** with cargo delivered to Container Stuffing location for export.

To-Be Business Process Flow

Illustrated below is the To-Be Empty Container business process flow.

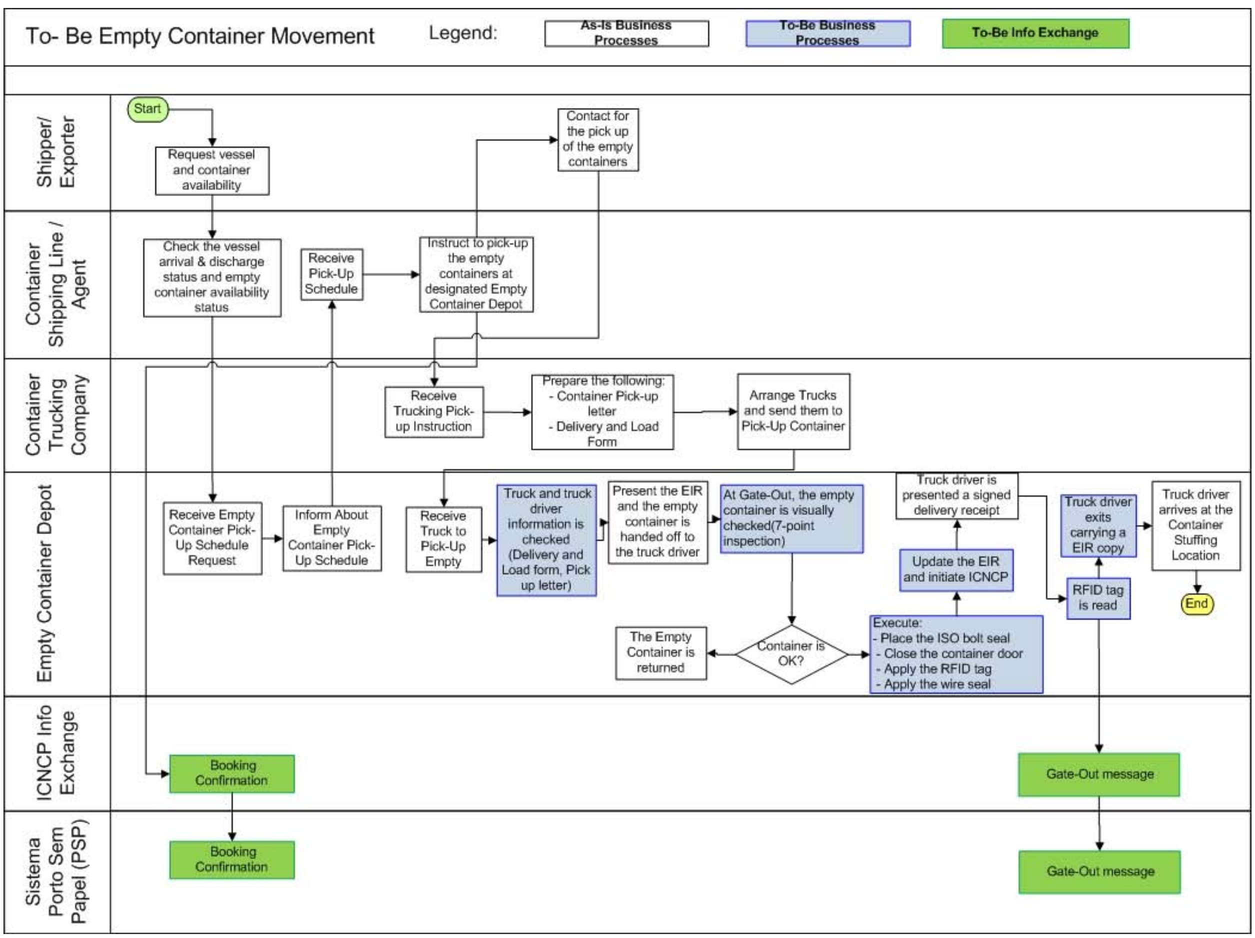


Figure – To-Be Empty Container movement business process flow

Illustrated below is the To-Cargo Movement business process flow.

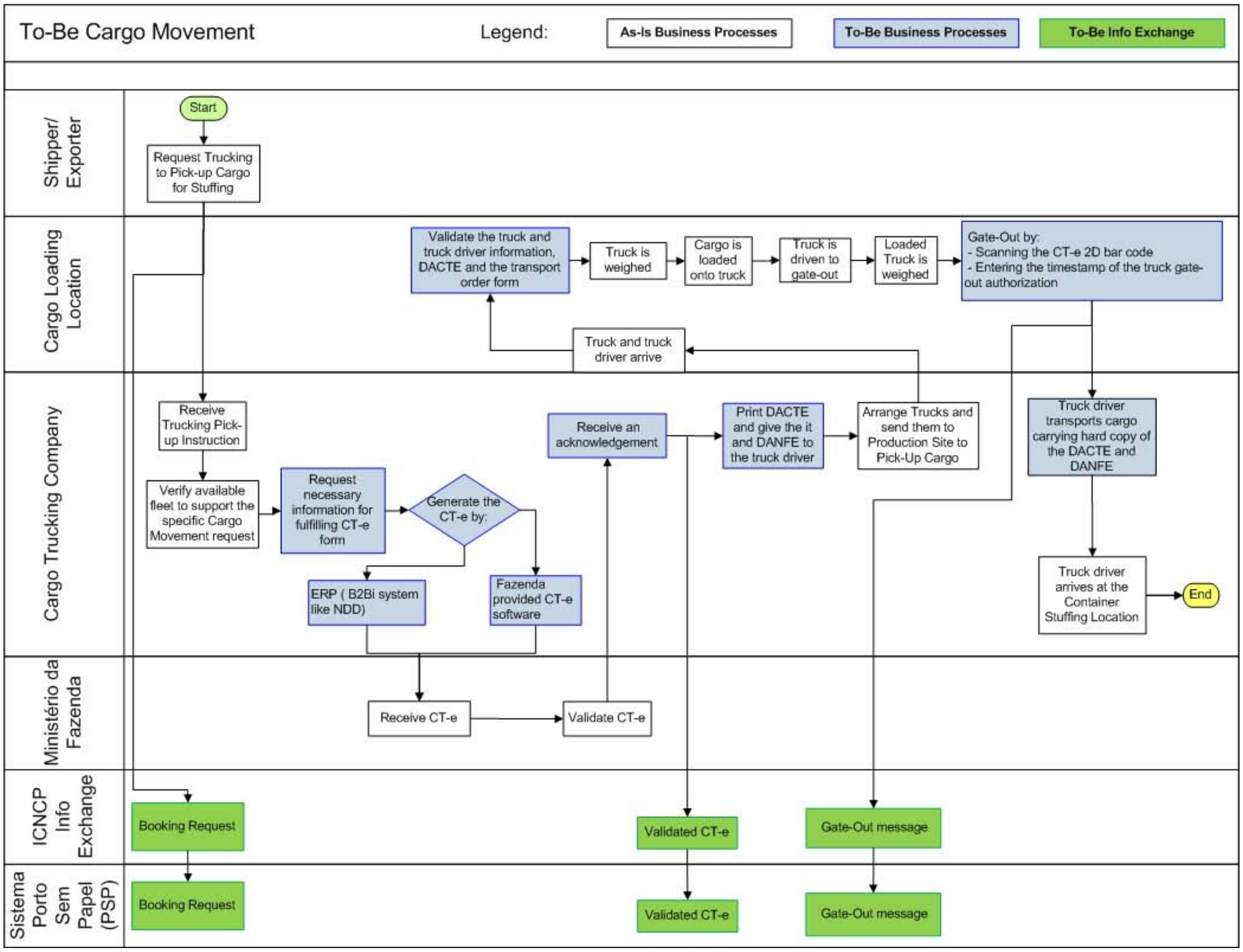


Figure – To-Cargo Movement business process flow

To-Be Container Stuffing

Description

To-Be Container Stuffing is the process involving the checking, stuffing and sealing of dry containers for export with cargo at the Container Stuffing Location.

For the purposes of the ICNCP project, the To-Be Container Stuffing control point will:

- **Start** with the check in of the truck drivers (Cargo and Empty Container) at the Container Stuffing Location
- **End** with the check out of the stuffed and sealed container from the Container Stuffing Location

To-Be Business Process Flow

Illustrated below is the To-Be Container Stuffing business process flow.

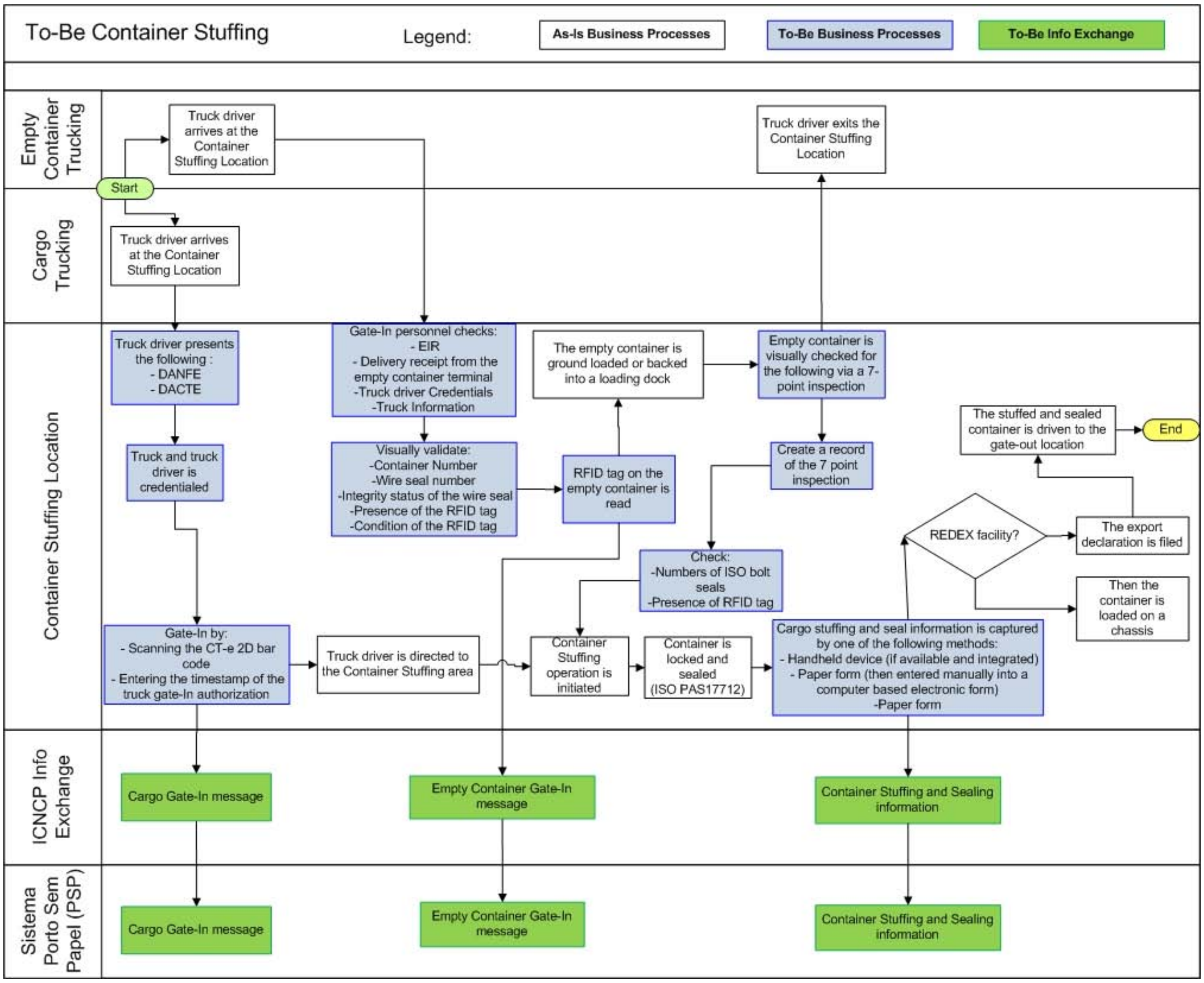


Figure – To-Be Container Stuffing business process flow

To-Be Container Inland Transport

Description

To-Be Container Inland Transportation is the process involving the transportation of stuffed and sealed export containers from the Container Stuffing Location to the Container Discharge Terminal.

For the purposes of the ICNCP project, the To-Be Container Inland Transportation control point will:

- **Start** with the Container Trucking Company or Container Stuffing Location scheduling the delivery export container utilizing the portal of the Container Discharge Terminal.
- **End** with the check in of the truck driver at the gate-in at the Container Discharge Terminal and validation of the Delivery and Load form information with the Booking Information by the terminal personnel.

To-Be Business Process Flow
Illustrated below is the To-Be Container Inland Transportation business process flow.

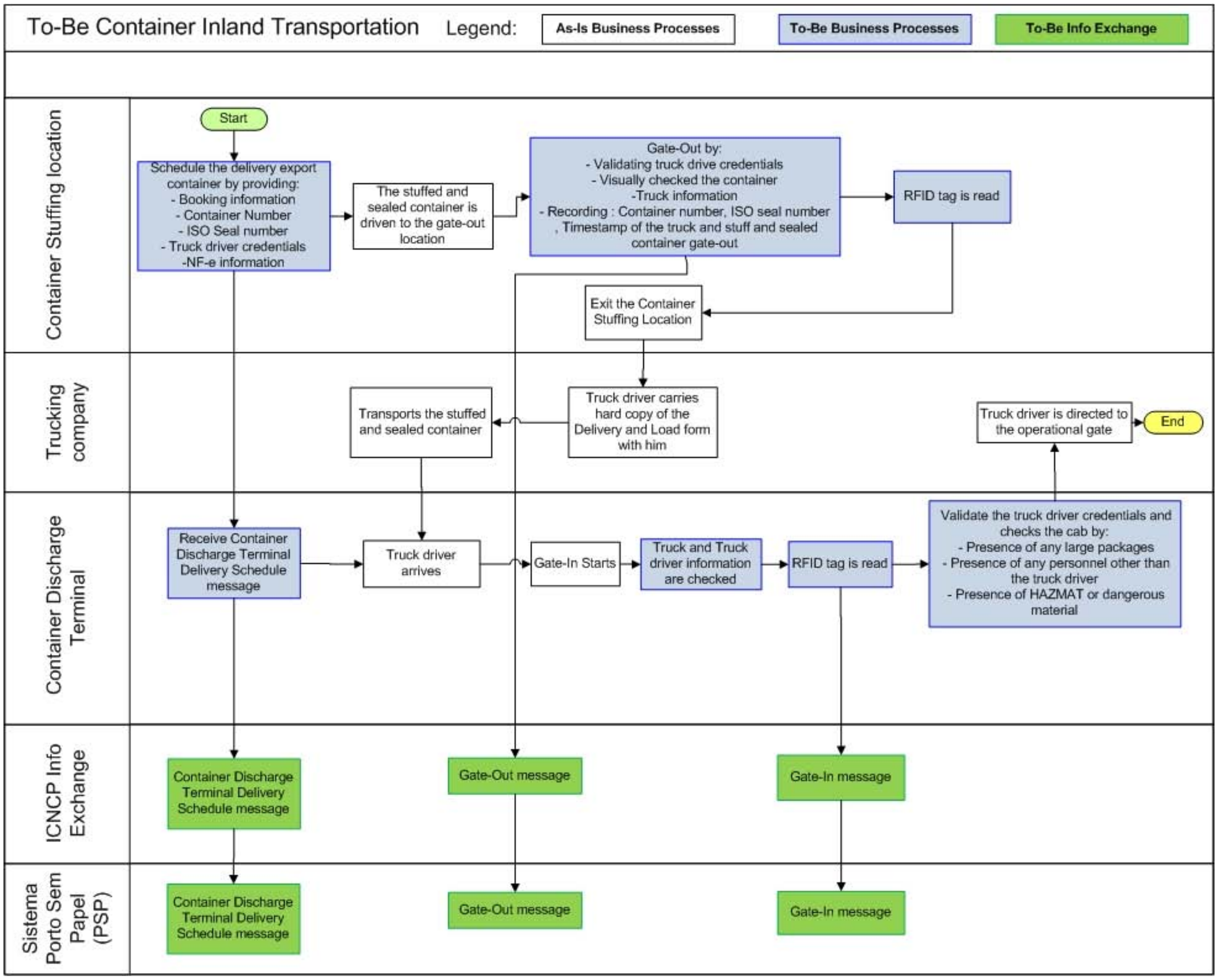


Figure – To-Be Container Inland Transportation business process flow

To-Be Terminal Operations

Description
To-Be Terminal Operations is the process involving the staging and stacking of the stuffed and sealed export containers at the Container Discharge Terminal and the loading of the export stuffed and sealed container on to an outbound export vessel.

For the purposes of the ICNCP project, the To-Be Terminal Operations control point will:

- **Start** with the truck driver leaving the first gate and checking in at the second gate within the Container Discharge Terminal
- **End** with the loading of the export container on the Container Shipping Line vessel at the terminal facility followed by the receipt of the revised Original Bill of Lading by Shipper/ Exporter from the Container Shipping Line.

To-Be Business Process Flow
Illustrated below is the To-Be Terminal Operations business process flow.

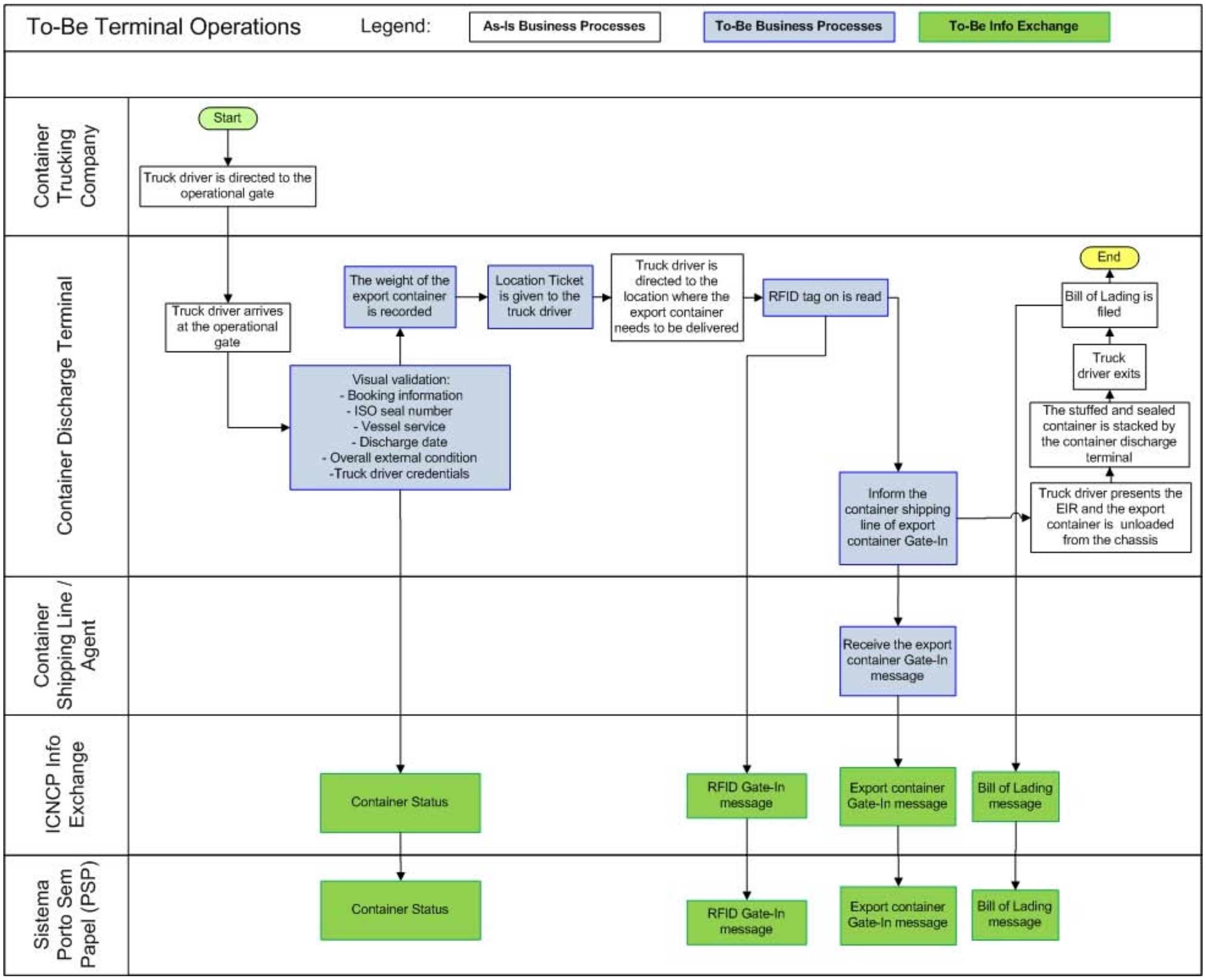


Figure: To-Be Terminal Operations Business Process Flow

To-Be Vessel Movement

Description
To-Be Vessel Movement is the process involving the loading and discharge of stuffed and sealed export containers from Brasil.

For the purposes of the ICNCP project, the To-Be Vessel Movement control point will:

- **Start** with Container Shipping Line providing booking confirmation to Container Discharge terminal
- **End** with the departure of the vessel.

Business Process Flow

Illustrated below is the To-Be Vessel Movement business process flow.

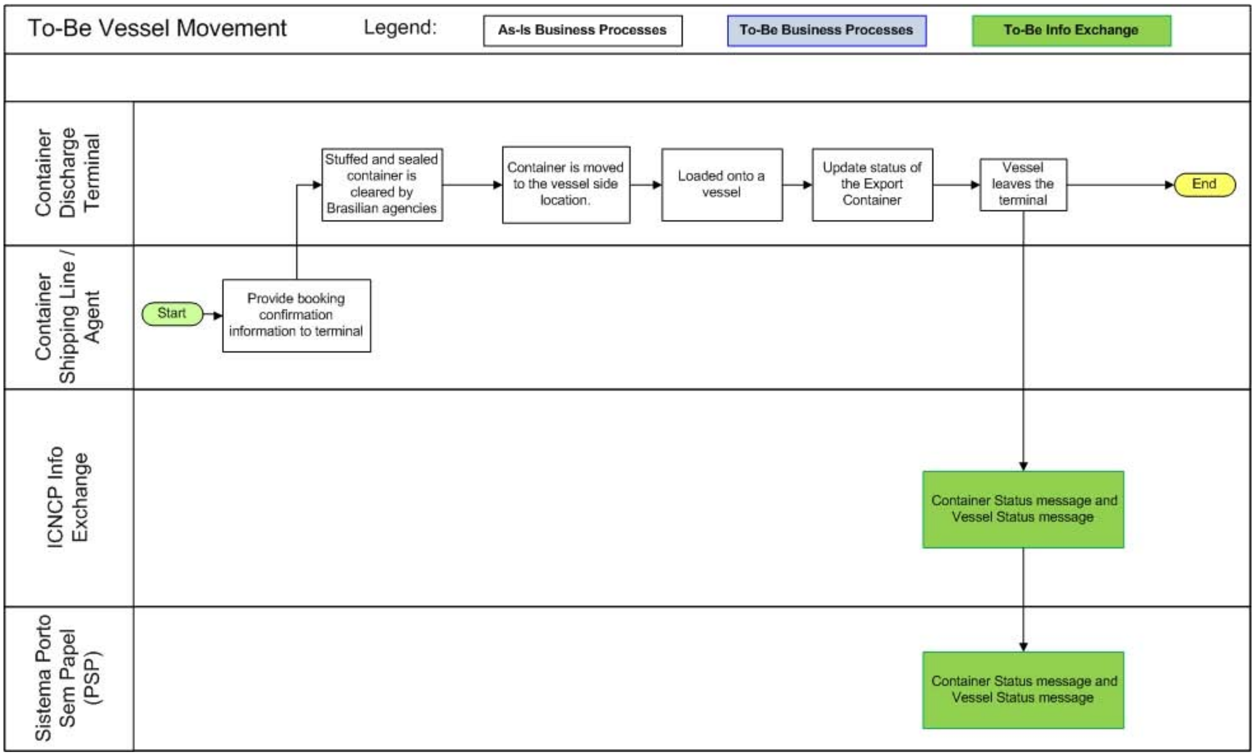


Figure: Vessel Movement Business Process Flow

2.2.6 Benefits

The benefits of increasing the capacity of government agencies to perform their mission objectives through adopting modern processes, automation, and integrated border management are well documented. These benefits accrue widely to not only the border agencies with direct responsibilities for trans-border cargo management but also to other elements of the supply chain and society.

In assessing potential benefits, the analysis should include the level, time to accrue, and difficulty to obtain. This report provides some of that analysis but as each recommendation is considered, attention should be paid to proper phasing of deployment to obtain the highest level of benefit in the shortest time possible. Expectations need to be managed to eliminate discouragement and disappointment since implementation of some recommendations will take longer to bear fruit.

For the purposes of the ICNCP To-Be Solution, the Unisys Team has broken down the benefits as shown below:

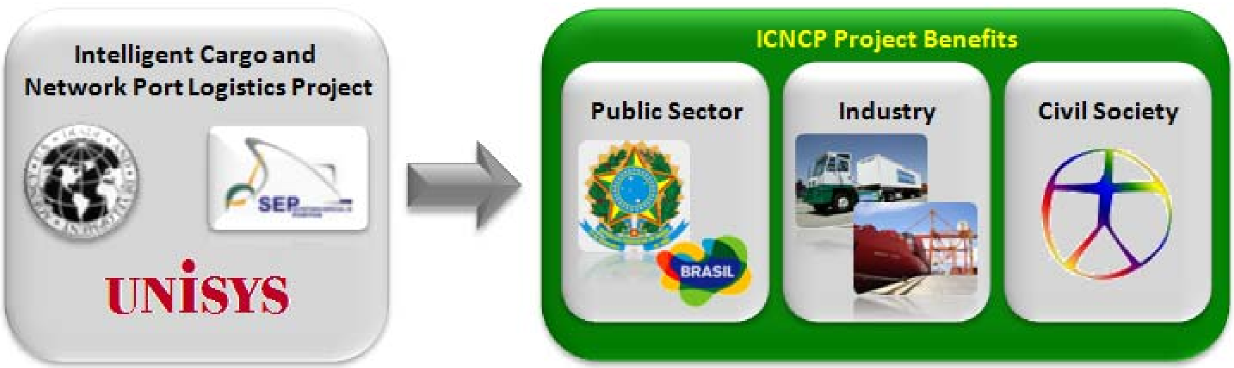


Figure: ICNCP To-Be Solution Benefit breakdown

Public Sector Benefits

Some of the benefits of the ICNCP To-Be Solution designed by the Unisys Team for government entities, including port authorities, health, agriculture, and customs administrations include:

Improvements in:

- Ability of all key stakeholders in processing increased volumes of secure cargo moving through ports
- Automating targeting systems with enhanced nodal data showing the route and times of passage for Monitoring Equipment equipped containers in the logistics chain
- Cargo risk assessment capabilities with the availability of additional cargo data
- Assigning import and export processing priorities accelerating cargo entry and control processes
- Confidence by the local community, port workers, and government agencies as to the physical security of cargo containers from hazardous and unsafe products

- Allocation of scarce government resources to conduct most effective and efficient mission objectives
- Managing Receita Federal resources to more efficiently deploy personnel to cover more high-risk containers and containers that have been breached in-transit
- Cargo processing efficiency, leading to facilitates enabling swifter transition of goods through the logistics chain, thereby mitigating freight congestion caused by delays in the transfer of information between partners
- Receita Federal (customs) capacity to:
    - Improve trader compliance for more accurate cargo classification, determination of value, and collection of accurate trade data
    - Increase transparency for more consistent application of regulations across all ports and all traders
    - Perform cross-border inspections for other government agencies
    - Comply with international treaty obligations such as revised Kyoto Convention and WCO SAFE Framework
- Providing a competitive advantage over other regional ports by offering processes and technologies that accelerate just-in-time deliveries such as a Common Standards for data and agency integration
- Tracking cargo movements throughout the logistics chain

Reduction in:

- Administrative and logistics costs resulting from long cargo dwell times
- Direct costs incurred by port authorities
- Data entry redundancy
- Number of systems and touch points between agencies allowing seamless inter-agency communication
- Idle dwell times for pollution-generating vehicles resulting in environmental benefits
- Fuel consumption and greenhouse gas emission, resulting in better environmental working conditions for the local community and port workers.

Industry Benefits

Benefits of the ICNCP To-Be Solution to shippers and other commercial supply chain participants may include:

Improvements in:

- Capacity to meet contract supply chain obligations including just-in-time delivery demands.
- Transparency of government regulations and processes to facilitate trade and compliance
- Shipment visibility and cargo and container tracking, leading to improved inventory management
- Export volumes for Brasilian exporters
- Overall business environment (culture, infrastructure, special tax zones) for sophisticated manufacturing
- Collaboration between shippers and service providers

- Communication between private industry and government agencies for cargo processing and inspection clearance
- Acquiring and sharing detailed shipment data visibility without requiring the industry to replace or overhaul their existing information systems
- Development of open, competitive markets by inclusion of small to medium businesses in information technology advancements

Reduction in:

- Documentation processing time and cost
- Container dwell time for carriers, lowering operating costs per shipment
- Security labor costs
- Cargo loss by way of theft and pilferage
- Inspection rates and customs intervention
- The potential for RFID secured containers to be expedited out of a port following a security incident.
- Demurrage charges to ocean carriers for containers not unloaded and returned within specified time limit
- Warehouse labor costs due to more accurate delivery date information

Civil Society Benefits

SECH ratings are defined as social, ethical, cultural and health footprints. Consumers have become more aware of the environmental impact of their purchases and companies' SECH ratings and, along with government and non-governmental organizations, are setting the agenda for transitions to organically-grown foods, anti-sweatshop labor codes and locally-produced goods that support independent and small businesses. Because supply chains frequently account for over 75% of a company's carbon footprint many agencies and organizations are exploring how they can reduce these emissions. Some of these benefits include:

Improvements in:

- Confidence in health and safety of consumer goods by ensuring compliance with government standards
- Capabilities in the interdiction of drugs, weapons and other contraband
- Revenues from government programs from accelerated and efficient duty and tax collection
- Job creation, resulting from knowledge that border efficiency is an added incentive for foreign direct investment
- Perception of good governance

Reduction in:

- Carbon emissions and other pollution by decreasing dwell time of carriers and trucks in and around Brasilian ports. Shown here is the typical morning truck traffic waiting on the outskirts of the Port of Santos, waiting to enter the port to either pick up or drop cargo or containers.

2.2.7 Barriers for Implementation

Implementation of changes in existing export logistics operation for government entities and the industry are often misunderstood by those affected by the changes, resisted and sometimes even ignored. Based upon past experience, the barriers for implementation can be divided into five categories as shown below:

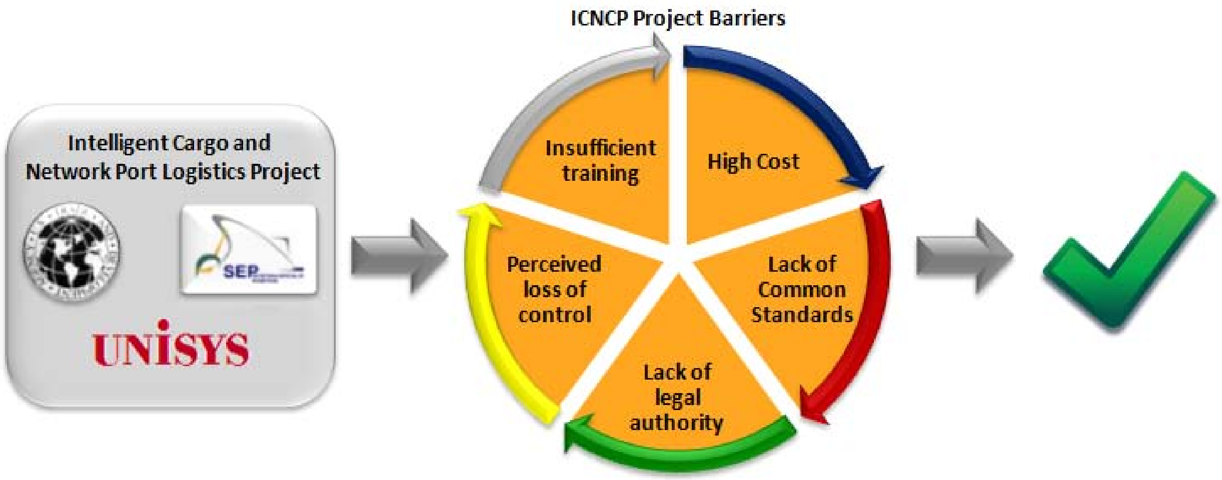


Figure: Barriers for Implementation

For the ICNCP to-Be Solution recommendations, each of the barriers:

- Has been identified by the Unisys Team
- An assessment has been made of its severity
- Mitigation strategies provided.

For ease of presentation, each of the five categories of barriers applies to each of the specific barrier identified in the report.

Technology Barriers	
Details	**Applicable Barriers**
Barriers to deploying the new technology to current Export Logistics Chain operations include: • RFID technology has a very slow rate of adoption • Systems integration and information exchange using the Sistema Porto sem Papel currently integrating six agencies • NF-e (Nota Fiscal Eletronica) has not been fully deployed • CT-e (Conhecimento de Transporte Eletronico) is in the process of being deployed • Container Shipping Line messages suc as EDI 300/301, 310 are 315 not always reliable	

Technology Barriers
Mitigation Strategy
• While many pilot programs and testing by government agencies, shippers and independent evaluators continue to be conducted, many of which have proven successful, the perceived lack of need for this application by many of the stakeholders has limited the widespread use of the technologies. • Better education of the users about the technology process, its low relative cost, and its benefits should reduce that barrier. • The stakeholders workshops being conducted by the Unisys Team is a significant mitigating initiative

Brasilian and International Labor Laws and Standards	
Details	**Applicable Barriers**
• There is no consistency of standards as the container changes hands through the transport chain creating delays, uncertainties, and reduced security. • Too many agencies are involved in the Export Logistics chain operations, however none of them are willing to change and give up their control over the export logistics process. In many cases, statutes mandate that control. • The severity of this barrier is high because the advanced processes are based upon common standards, integration of management, and a sound legal basis for the optimized system.	
Mitigation Strategy	
• Review the existing domestic legal authorities, develop the necessary legislation to provide for common standards consistent with international standards, and seek adoption by the legislature. • Determine the appropriate integration of agency responsibilities and develop regulations to support a common control system for container movement.	

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Commercial, Governmental and Internationally Mandated Security Requirements	
Details	**Applicable Barriers**
• The lack of a mandate or incentive from government agencies as well as competing technologies and form factors for devices have made shippers and carriers slow to adopt on-container RFID technology for security purposes. • The lack of clear operating procedures between the stakeholders. In the event of a breached container, it is not the port terminal operators' responsibility to take any action. The port authorities are not paying their labor to inspect containers and to conduct what is considered Customs' work. The port is prepared to be responsible for reporting broken seals and moving containers to an area where Customs or some other government agency could deal with them. • Shippers of high value products that are susceptible to theft and pilferage are considering improved security seals. However, they have very little incentive to invest in these seals since the cost could result in a competitive advantage for a competitor that does not invest and since their goods are insured against loss. • Even if security were not a major concern for shippers, most parties involved in the Logistics Chain would like to have better visibility of the movement of their goods. The impediment here is that the value provided cannot justify the current high costs of the technologies. There is not yet any significant scaling advantage for products and developers are still charging prices that shippers are not willing to incur. Most shippers are waiting cautiously to see what the governments or WCO will implement in terms of requirements for container security.	
Mitigation strategy	
• Adopting regulations mandating the necessary standard conformance for these technologies. • By mandating standards, all relevant stakeholders will be required to use the technology thus increasing the number of technology units required. By increasing production, the costs for the technology suppliers will be reduced and should result in lower costs to the users. • Mandating standards for all participants removes any competitive advantage between service providers thus ensuring more universal application. • Encourage insurance companies to reduce premiums for shippers using security and tracking solutions or increase the premiums for those that do not to create an incentive for broader application of the technologies.	

Costs	
Details	**Applicable Barriers**
For the ICNCP To-Be Solution to be success the following cost related issues need to be addressed: • Clear concise direction on costs associated with stakeholder investments for system and people for the deployment of the design • Price points that exceed what many end users, including shippers and carriers, are willing to spend in the absence of a government mandate will restrict implementation. • Ports are currently investing more for efficiency than for security. • Government resources are limited for introducing new technologies without demonstrating a savings benefit.	

Mitigation strategy

- Clear communication from the Brasilian Federal government led by SEP, to the industry highlighting the rough magnitude requirements and costs associated with implementing and deploying the Sistema Porto Sem Papel and the ICNCP To-Be Solution design
- Port terminal systems that monitor assets should improve logistics at ports, such as more efficient movement of trucks handling the containers.
- New processes and systems should be addressed as an investment with a positive return on that investment.
- A cost-benefit analysis should be undertaken for each of those new processes that require additional resources.
- The lack of understanding that security should be an integral component of improved logistics can be mitigated through education and mandated standards.
- An element of the cost benefit analysis should include compliance with obligations of the government to civil society and international conventions.

Overall	
Details	**Applicable Barriers**
• Ocean carriers and other intermediaries are not as concerned with security as they are with the timely movement of the cargo. There is no perceived benefit for them to "spearhead" the effort for improved supply chain security. • Those service providers are currently adopting a passive attitude and are waiting to see how the market develops. They do not want to be the first group to invest in expensive solutions.	
Mitigation strategy	
• Through adopting international standards such as those in the ISPS and WCO instruments, governments can take the lead in requiring the adoption of new technologies that improve efficiency and security. • Traders, service providers and government agencies will then adopt and invest in those technologies that provide conformance to those standards.	

2.3 Phase 3 - Assessing the Impact of an Intelligent Cargo and Intelligent Network Port Logistics Chain

Industrial incentives and investment by the Government of Brasil in transportation infrastructure have encouraged economic development in more remote areas of the country, however Brasil's transportation costs have significantly hindered Brasil's position in international commerce and expansion of its economy.

With guidance from SEP, the Unisys Team focused on the Export Logistics Chain with a goal of documenting and analyzing the impacts of the high level To-Be design. As part of Phase 3 of the ICNCP project, the Unisys Team drafted, compiled, and submitted a deliverable report that encompassesed:

Figure: Impact Assessment Phase Focus

- **Development Impacts**, potential local, regional and national impacts of implementing the future intelligent network port logistics chain.
- **Environmental Impacts**, potential environmental impacts and mitigation strategies focused on implementing the future intelligent network port logistics chain.
- **Regulatory and Other Institutional Reforms**, that may have become outdated can be a barrier, so the relevant rules and regulations in Brasil that could be reformed to support the implementation of an intelligent network port logistics chain will be pointed.
- **Development and Operating Funding Alternatives**, the various alternatives for funding the development and operation, these alternatives may include cost-reduction/recovery and revenue-generating regarding to supply chain services and logistics chain performance.
- **Potential Sources of Supply,** the technology solution options that form the new intelligent network port logistics chain system and list them.

The section and diagram below focus on the impacts that the ICNCP project may have in the areas of the development of Brasil as well as on environment which is a high priority of the people of Brasil.

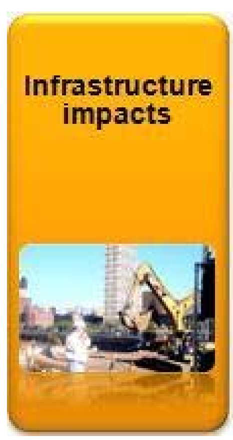
Figure: Impact Assessment focus

2.3.1 Development Impacts: Local, Regional and National

Improving the logistics infrastructure is critical to the future economic growth of Brasil. Recognizing this, the Brasilian government has made significant investments in the country's logistics infrastructure and has also opened the economy encouraging private investment. Improvements in physical infrastructure, however, are not all that is required to advance the economy. Investment in logistics technology is required to meet the increasingly demanding requirements of shippers. The unavailability of timely information prevents the efficient movement of cargo through the ports and retards Brasil's domestic and international commerce.

Infrastructure impacts

This section states how enhancements to current infrastructure via the ICNCP project will benefit the port. In addition, the Unisys Team has tried to provide quantitative estimates of impact of solutions/ projects such as the ICNCP project on port infrastructure.



In the section below the Unisys Team has documented the local, regional and national level impacts to deploying and implementing the ICNCP project in the areas of Infrastructure, Human Capacity, Technology and other areas relevant to the project.

Local

The ICNCP project enables near real-time shipping and cargo information to be available in the field for tracking and enforcement purposes via a secured centralized database such as the Sistema Porto Sem Papel and has the potential to eliminate or reduce significantly the use of paper documents for the tracking and management of cargo containers. Because cargo information is always located on secure central databases, the authenticity and integrity of information referenced by the technologies placed on the cargo container can be effectively protected and verified. Central, automated control of such critical cargo information is vital to data integrity and the port authority to track and manage container shipments.

The ICNCP project design verifies vehicles, containers, contents and drivers with the use of an integrated, layered solution. The retrieved data, including current taxation status, shipment information, consignor and consignee, bill of lading, shipment detail, SECEX permit, import permit, cargo container previous consignment records and relevant infringements or associated alerts, can then be verified by authorized operators. The amount and type of data that could be potentially returned and managed by the ICNCP project design can be customized to SEP's requirements. The relevant shipment information that is displayed allows for immediate verification and enforcement by the users and can enable the Sistema Porto Sem Papel databases containing previous relevant enforcement records (including tax payment status, cargo consignment information, container number, container status, import permit and previous cargo container consignment information) to be cross referenced for any related checks or infringements where necessary or required.

Locally at the port, the ICNCP project will enable port officers and enforcement officers to retrieve real-time information related to the transport, container and driver and detect anomalies, discrepancies and outstanding infringements for immediate action.

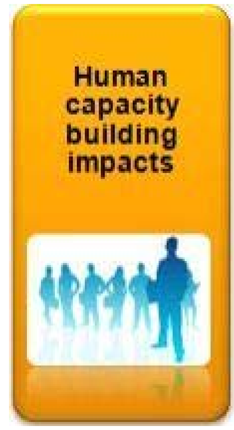
Regional

Because the ICNCP project design interconnects to the Sistema Porto Sem Papel system via a common Application Programming Interfaces (API), the data that is collected and managed within the individual port can be shared as required with other regional transportation or government authorities. Hence, the ICNCP project design can be implemented either as a standalone solution or one that is interconnected to the databases of other Brasilian regional groups to share related data, or to be cross referenced as goods in containers are moved within particular regions.

National/Global

In much the same way as the ICNCP project would enable local logistics chain operations data to be integrated with regional logistics chain operations, it can provide the advantage of interconnectivity to National or Global logistics systems. Logistical information collected and processed on containers within Brasilian ports can be shared with other organizations and countries. Furthermore, a subset of important cargo data can be shared with outside entities as Brasilian containers move across international borders.

Human capacity building impacts
The largest long-term investment in the port logistics chain is in the people who manage the various processes, procedure and technologies. As a result, the greatest impact of implementing the ICNCP project is on the people.



Generally public sector and private sector staff are adverse to change in the way things are currently done as fear of the unknown raises risks for their future employment. The following section briefly examines both the immediate and long-term potential impacts to employment and human capacity building on both the public and private sector in Brasil, as they relate to the implementation and operation of an ICNCP project.

Public Sector
It has been observed that government agencies in Brasil are usually understaffed and therefore a lot of pressure is exerted on existing staff to be more productive in meeting the demands of increasing trade flows. In conducting the Impact Assessment, deploying and implementing ICNCP project will result in:

- An increase in productivity thereby resulting in an increase in efficiency, generating more trade flow and in turn necessitate increasing the number of jobs
- Depending on the agency structure, an increase in employment by creating new opportunities for more skilled and knowledgeable agency staff that would be trained on how to leverage the existing systems more effectively
- More effective deployment of human resources by orchestrating a shift to more skilled labor
- Reduction the in task redundancy and time needed to execute the various tasks
- Better use of risk management systems by the participating government agencies who can then re-deploy staff from routine paper processing to more important compliance efforts for the higher risk shipments
- Better trained port personnel on the usage of the application adopted thereby reducing the dependence on manual labor.

Private Sector
Logistics chain stakeholders in Brasil are facing the same pressure to obtain higher productivity from existing staff. The increase in the number of documents, particularly with the new security information demand is astounding. The ICNCP project will provide for increased efficiencies and depending on the type of logistics chain stakeholder could in fact reduce employment needs. Based upon the volume of trade and the human resources assigned to the logistics supply chain, some operators have shown a savings between five and ten percent. More likely however, as trade volumes increase, the human impact of the ICNCP project may be to enhance the ability to manage that increased trade flow without adding new personnel, thus realizing future savings.

Transport operators and shipping companies will need to train their staff on the new processes and procedures introduced at the port based upon the solution adopted. Similarly, these requirements will bring about the need for these private companies to invest in growing the skills of their existing employees or in the long term, recruit and hire employees with minimal IT skills to keep abreast of the increased use of technology in port operations. Ultimately this will help move the industry as a whole towards greater automation and increased use of technology and with that, building a more knowledgeable, IT savvy workforce.

Studies by the United Nations Conference on Trade and Development (UNCTAD) have shown that for the in-country production sector new employment opportunities would be created in agriculture and industry, and more specifically, in any sector where production is delayed or uneconomic because of long delays and unpredictability in the import-export supply chain. For example the UNCTAD study of the Kenya Single Window to facilitate the export of perishable agricultural goods demonstrated that the soon be introduced system will reduce transaction and handling costs associated with spoilage because of delays in customs and port processing. This new system was designed to preserve and promote jobs in the agricultural sector by facilitating the exports of these goods.

Similarly, Brasilian firms that can more accurately predict export shipments will increase their volume of production resulting in more employment in both the manufacturing and support functions of those firms. In a study commissioned by the Economic and Social Commission for Asia and the Pacific (ESCAP) the authors determined that:

- Trade facilitation variables have significant effects on exports of different products, in varying degrees, depending upon the proxy used.
- The Logistic Performance Index (LPI) has large positive effects on value of exports of all the product categories.
- The estimates for trade costs are negative and significant as expected.
- Improving trade costs and time delays in South Asian countries up to the average values of best performer in South Asia (least cost is recorded for Pakistan and best LPI is observed in India) bring down trade costs by over 17% and improvement in LPI s by 0.72, resulting in an increase in the value of agricultural trade of 18% and 27% respectively.

These results indicate that, by reducing inefficiencies at the borders in South Asia, significant trade gains can be achieved.[1]

Another study in New Zealand provides an example of the savings impact to traders of a single window. It is a survey of the customs brokers/freight forwarders conducted by the New Zealand Government about their Trade Single Window (TSW)[2]. When asked to identify how much time per consignment their company would save if they had to make only one submission to get an export or import clearance, most indicated 5-15 minutes, but some responded over 15 minutes. The table below indicates that the greatest benefit is for imports but there is a significant time savings for export processing.

[1] Impact of Trade Facilitation Measures on Food and Agricultural Trade in South Asia; Session 11: Gravity Modeling and Trade Facilitation in South Asia; Authors: Jeevika Weerahewa and Bimali Wijeratne Department of Agricultural Economics and Business Management Faculty of Agriculture; University of Peradeniya, Sri Lanka

[2] New Zealand Customs Service, Trade Single Window, www.customs.govt.nz/Border+sector/Trade+Single+Window+(TSW)/Trade+Single+Window+(TSW).htm

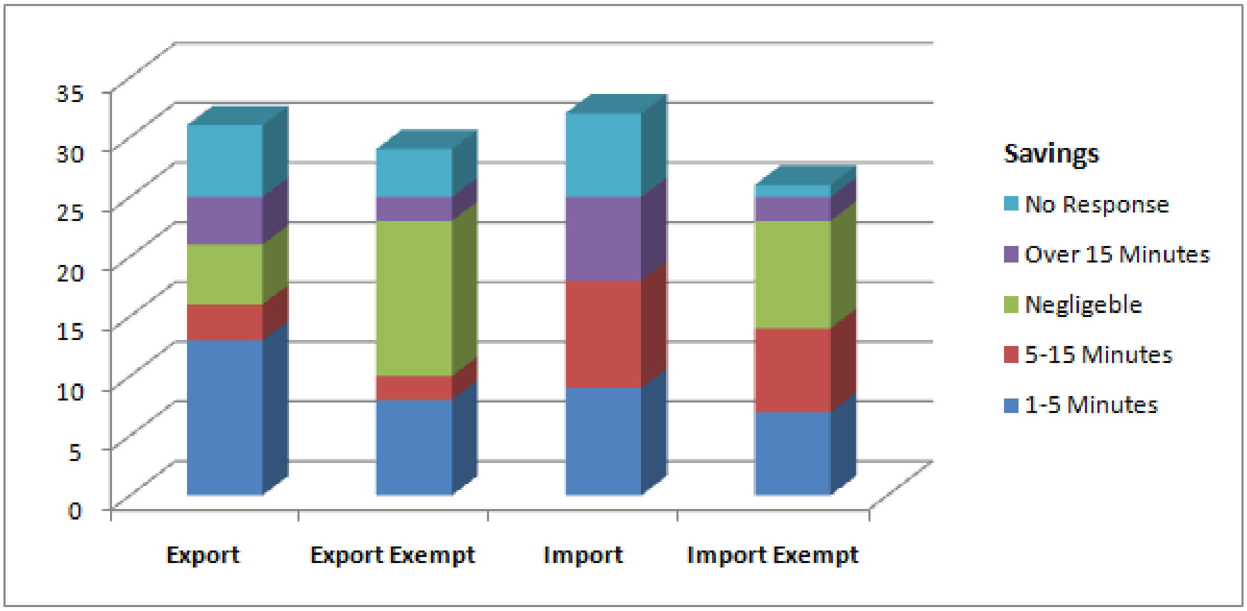


Figure: Potential savings from single window deployment in New Zealand

When asked to estimate the average monetary value of one hour of time saved by utilizing the potential business processes offered by TSW, 12 responses were in the range of $25 to $85, averaging $48. Other responders said $100, $150, $200, $300, $500 or $1,000. Applying hourly rate to the total hours saved for each of the responder's total transactions in a year indicated there is potential for significant cost savings in TSW, especially for those companies that process a large number of consignments.

This could be used as a baseline and hence the ICNCP project has a potential positive impact on the human capacity building aspect for Brasil.

Technology transfer and productivity impacts

In Phase 2 of the ICNCP project, the "To-Be" solution for a typical Brasilian export logistics chain was developed and presented. A key component of the design is the use of technology to enhance the efficiency and security of the export process. Technology was applied to achieve Business Process Enhancements, provide Cargo Monitoring Mechanisms, and establish a Systems Integration and Information Exchange.

The solution design was established in conformity with the following agreed parameters:

- Low-tech - does not employ high tech smart container devices
- Low-cost - limiting the amount of investment needed from the public and private sector entities
- Non-invasive – leveraging business process and lessons learned with a minimal footprint
- Practical – utilizing industry best practices that have been successfully deployed in the past

- Deployable - in the short to medium timeframe, minimizing the amount of time needed by the logistics chain partners to utilize the solution in their current operations.

To achieve these objectives, the solution design incorporates certain technologies in the following processes:

- Business Process Enhancements – the use of an Intelligent Cargo and Logistics Interface (API) using the US DOT developed Electronic Freight Management (EFM) initiative as a model.
- Cargo Monitoring Mechanisms – the use of RFID tags and RFID fixed readers to track cargo and facilitate the capture of cargo movement data.
- Systems Integration and Information Exchange – the use of the Nota Fiscal Eletrônica (NF-e) program to digitally capture transaction data such as the sale of goods and services and the Conhecimento de Transporte Eletrônico (CT-e) program to digitally capture intermodal transportation data.

The impact of new technologies can be assessed effectively using established benchmarks for the same or similar technologies in operation as well as the results of conducted tests. The technologies noted above have demonstrated the ability to positively impact supply chain operations.

Systems Integration and Information Exchange

The Unisys team looked at the Electronic Freight Management (EFM) initiative as a baseline for the Systems Integration and Information Exchange component of the ICNCP project design. In keeping with industry standards, the Unisys Team designed an open-architecture; Internet-based solution that allows supply chain partners to efficiently track freight shipments as they move through the supply chain. It provides an information sharing alternative for firms that currently use fax, email, or telephone communication with their supply chain partners. It offers uniform access to existing customized database formats, allowing each supply chain partner to exchange data with other supply chain partners via web services using Extensible Markup Language (XML) data standards. The framework employs secure encryption and digital certificates, ensuring that any information exchanged between partners is authorized, that data is not corrupted in transit, and that the data transmitted is complete.

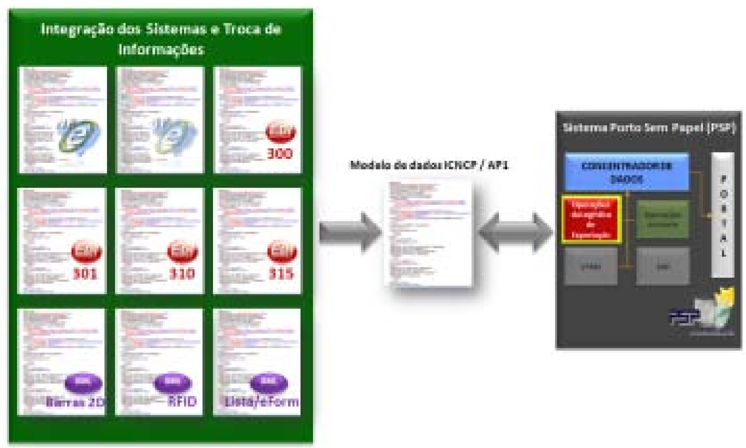
In conducting the Impact assessment, the ICNCP project has shown the capability to positively impact the export logistics chain in the following areas:

- Provide end-to-end shipment status information to all logistics chain partners on a near real-time basis
- Protect information security and integrity by sharing shipment data in a safe and secure environment between partners as authorized by the data owner
- Provide open source non-proprietary applications based on public standards, facilitating entry of all participants in the logistics chain process
- Ability to integrate with logistics chain legacy systems, eliminating the need to replace any existing systems

- Improve logistics chain efficiency by eliminating redundant data entry, shortened data processing times to enhance management decision-making ability, improve ability to manage shipment exceptions, and reducing the dwell time of freight in transit
- Provide a web-based portal via the Sistema Porto Sem Papel system, for efficient and timely access to shipment data for all users – data entered once and used by many
- Provide a reliable mechanism for unique identification for each cargo shipment consistent with existing WCO standards

Nota Fiscal Eletrônica (NF-e) produces a digital document that can be used to provide validation of the sale of goods or services between parties. Additionally, it can be used to document transactions for tax purposes. In conducting the Impact assessment, the Nota Fiscal Eletrônica component of the ICNCP project has shown the capability to positively impact the export logistics chain in the following areas:

- Document has legal standing when authenticated by digital signature of the sender and receipt by the Treasury
- Enhances the ICNCP Master Data Set by providing an electronic record of information such as identification of the vendor, the customer, the type of goods or services being acquired, availability status, and the entity transporting the goods.



Conhecimento de Transporte Eletrônico (CT-e) produces a digital document to record information relative to the shipment of cargo by all transportation modes (Road, Air, Rail, Waterway and Pipeline). Additionally, it can be used for tax purposes. In conducting the Impact assessment, the Conhecimento de Transporte Eletrônico component of the ICNCP project has shown the capability to positively impact the export logistics chain in the following areas:

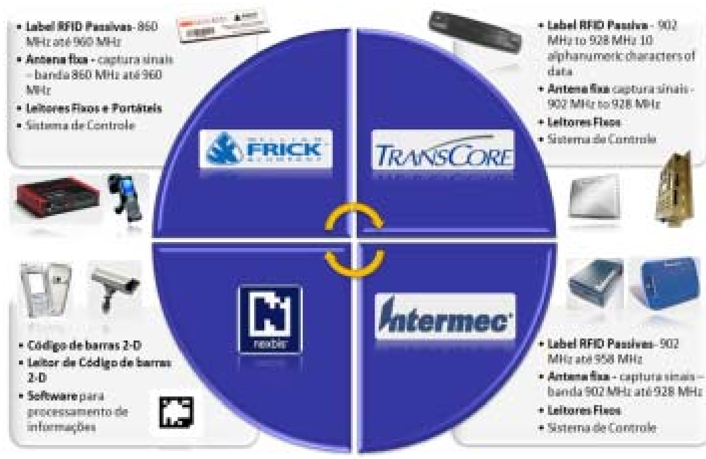
- Document has legal standing when authenticated by digital signature of the sender and receipt by the Treasury
- Enhances the ICNCP Master Data Set by providing an electronic record of information about the cargo being transported such as the transport company, transport mode, transport carrier information, product value, taxes, quantity purchased, delivery forecast, etc

Container Monitoring Mechanisms

Radio Frequency Identification (RFID) Technologies was one of several container monitoring technologies considered for inclusion in the ICNCP “To Be” solution. RFID was selected as the best fit to comply with the low-tech, low-cost objectives for evaluation. As used in this report, RFID is a system that transmits the identity of an object in the form of a unique identifying number using wireless radio waves. The ICNCP “To Be” solution features a two-component architecture, a tag containing a microchip with the appropriate identification data and a fixed reader, typically installed at points of entry and exit, to extract that information.

In conducting the Impact assessment, the ICNCP project via the RFID solution set has shown the capability to positively impact the export logistics chain in the following areas:

- Enable fixed readers to capture data on tags and transmit it to a computer system—all automatically without needing a person to be involved
- Low acquisition cost, ease of installation, minimal training requirements
- The microchip has the flexibility to store additional information about a product or shipment such as date of manufacture, destination, as well as shipper and importer data
- Automatic generation of data communicating the status of end-to-end shipment for both shipper/ exporter, confirming departure and arrival times from empty container pickup to final discharge at destination - by knowing which readers are in which locations, companies can know where a product is, as well as what it is, and because of the time stamp, they can know everywhere it's been.
- Accurate status information and asset tracking allowing inventory reduction by facilitating better management of product requirements
- Eliminating the need for manual scanning, reducing labor costs while enhancing data accuracy and security
- Promoting asset security by identifying unauthorized movement or misrouting
- Promoting data security through use of encryption algorithms



Other Impacts

The deployment and implementation of ICNCP project offers many promising benefits to trade and governments. These benefits allow for better use of federal funding, an increase in the development of skilled labor, a positive impact on the environment, and the technological advancement at the port clearance level. In addition, many of these promising benefits, while not immediately visible, will continue to provide benefits in the long-term.

The development of multi-industry, multi-modal systems has the potential to improve productivity, security, employment, the environment, and other dimensions that are of importance to Brasil. A well-implemented intelligent export system will result in a net gain of benefits versus costs. The benefits are inter-linked; therefore, one follows the other. An ICNCP project based design can increase security, profitability, efficiency, accuracy, and employment levels. In addition, the ICNCP project will result in other benefits to the government, the region, and the environment. Taken in turn some of these impacts are:

Security
In today's supply chain, security has become paramount. Advanced import data, tracking of cargo and improved management of cross-border trade are becoming the norm for today's economies. Most export destinations such as the United States, Europe, Japan, and China require increased surveillance and tracking of cargo into their ports. Deployment of the ICNCP solution will enhance that security in both the public and private sectors.

Public Sector
Deployment of the ICNCP project will provide Brasil the ability to:
- Meet security demands up to the point of lading the cargo onto the vessel
- Manage a more robust risk assessment system that increases both physical and revenue security
- Help reduce illegal container consignment and smuggling activities
- Detect the importing and exporting of prohibited goods without permit
- Immediately access cargo container information to validate custom clearance, tax payment or to provide the most current status of transport/cargo information
- Improve the accuracy of data that will reduce the improper declaration of container consignment information.

Overall, it will provide a basis for developing a more comprehensive solution to track that cargo through the supply chain

Private Sector
Deployment of the ICNCP project will provide the private sector logistics chain stakeholders with:
- Shared cargo information in an automated manner to ensure location, cargo type, and status
- Standardization of documents in order to streamline activities at the border and maximize security and efficiency;
- Ability to use the same data for the same procedures reducing the chance for error and reducing variations in the information provided;
- Ability to track container and cargo through better data accuracy and verification; and,
- Ability to move the container more rapidly through the system. "A container at rest is a container at risk."

Increased Revenues
Public Sector
One important benefit to Brasil is increased revenues, which can possibly aid in funding new technology and systems. In addition, studies have shown that strategies designed to facilitate trade significantly boost economic development. In 2002, an APEC study found that a five percent reduction in trade costs for goods would raise APEC's GDP by 0.9 percent. Trade facilitation initiatives like the ICNCP project lead to marginal reductions in trade transaction costs, contributing to greater national revenues and GDP. The benefits to developing countries are greater than those to developed countries, as developing countries are usually in a worse starting position. Developing countries like Brasil, experience higher trade flows and

government revenues by implementing programs that increase the efficiency of that trade flow and the collection of revenue.

Private Sector
Studies over the last several years have shown that dwell time in the logistics chain operations is a relevant factor in competitiveness in international trade.

In the 2006 study "*Trading on Time*"[3] conducted by Djankov, et. al. on behalf of the World Bank found that:
A delay by a day reduces trade by 1% (more for developing countries and for agricultural products)."

In the 2008 study *Time as a Determinant of Comparative Advantage*" by Yue Li and John S. Wilson for the World Bank found in part that:
In industries having just-in-time business practices the entire production process will come to a halt if even a single input is missing. In industries shifting toward a more fragmented process and relying on international supply chains, delays in the delivery of intermediates accrue in all successive production stages. Eventually, small transaction costs can amount to disproportionately large values.

Time delays yield higher transaction costs for these time-sensitive industries, and, thus, disproportionately dampen their exports. Given this, the large differences across countries in the time need to export may help to explain why exports in sectors relying on timeliness grow rapidly in some countries but remain impeded in others. That is, time acts as a determinant of comparative advantage in addition to a wedge on trade flows. The variations in countries'ability to move goods for exports stem from differences in the efficiency of infrastructure services, logistics services, trade regulations, customs administration, as well as the quality of broader regulatory policies and institutions.

Hence, deploying the ICNCP project will significantly reduce the time for export of goods.

Transparency and Compliance
Public Sector
Another positive impact is increased transparency of the export clearance processes. This transparency can in turn increase faith in the government and its abilities to manage border formalities. A more transparent system allows authorities to pinpoint the source of a problem if a challenging situation should arise.

In utilizing the ICNCP project, the process is will be more visible to exporters and will encourage greater compliance with regulations. The ICNCP project along with Sistema Porto Sem Papel will function as a focal point for updated trade regulations and requirements, which could possibly decrease administrative costs and further increase trade compliance. Making those

[3] *Djankov, Simeon, Caroline Freund, and Cong S. Pham, "Trading on Time" World Bank Working Paper #3909, (2006).*

rules and regulations more transparent brings about better "informed compliance." These results will undoubtedly lead to an increase in the success of the government's border control and protection authority.

Private Sector
Reducing the time for producers to export goods out of Brasil should save costs and increase revenues. In addition, increased transparency in the rules and regulations of trans-border transactions allows private operators to be save funds and be more compliant. Current practice requires private companies to maintain staff, service providers and others to monitor and report on changes in government rules and regulations. Making those changes more transparent will accelerate the availability of that knowledge. Being better informed of the rules and their changes allows operators to be more compliant.

Licenses and permits
Public Sector
The ICNCP project will allow better use of limited resources. In order to streamline activities, government agencies will make full use of technological capabilities utilizing resources that contribute to increased efficiency by decreasing data repetition. Providing data to the all relevant government agencies through a common system or single window decreases repetition and the costs of providing, collecting, analyzing, and disseminating data multiple times. Applications for licenses and permits, certification approvals, and other export requirements will be processed in a more timely and efficient manner, resulting in costs savings in time and resources. The example of the United States included in Phase 2 of this study illustrates how an ICNCP project like strategy reduces the burden and cost of sending data. With the introduction of the ICNCP project, a more efficient and organized port can now assist in the reduction of transportation costs and fuel costs, as well as waiting time for transport/cargo clearance.

Private Sector
If the Brasilian government agencies utilize and leverage the Sistema Porto Sem Papel system via the ICNCP project, they will be able to share cargo information with the private sector in an automated manner. The corollary to the government's receiving data to the government through a common system thereby decreasing repetition and the costs of providing data multiple times is that applications for licenses and permits, certification approvals, and other export requirements will be processed in a more timely manner resulting in costs savings in time and resources. Operators can plan more efficiently and the time for processing will be more predictable. Sharing data electronically will assist in the reduction of document processing times, transportation and fuel costs, as well as waiting times for transport/cargo clearance at the ports and other logistics chain control points.

Logistics chain intermediary capacity
Public Sector
The public sector will benefit from increasing the capacity of intermediaries and third party service providers, including non-vessel owning commercial carriers (NVOCCs) in the logistics chain to participate in the improved systems for cargo clearance. Some of those benefits include:

- More accurate and timely data transmission

- Participation of knowledgeable private stakeholders as advisors to government agencies. i.e. public-private partnerships
- Increased compliance with requirements

Private Sector

The middlemen and/ or third party service providers are an integral component of the logistics chain and must be part of the ICNCP solution to achieve the greatest benefit from interoperability. Some of the benefits of increased capacity of intermediaries include, but are not limited to:

- Ability to share in the overall costs of an automated system
- Reduction in possible errors in the collection and transmission of data
- Brokers with the knowledge and capacity to provide correct advice to operators to ensure better compliance
- An acceleration of the time to process export requirements

Regional Integration

The importance of enhanced regional integration resulting from the ICNCP project cannot be overstated. As individual countries increase their own efficiencies at the border, they also reduce onerous barriers to regional integration. The IDB report, *Unclogging the Arteries*, makes a strong case for regional integration in LAC by stating,

"More integrated markets facilitate the free flow of goods and factors across borders allowing countries to benefit from a better reallocation of resources. . . . Today, countries in Latin America and the Caribbean recognize the increasingly important role that integration plays in their development."

Adequate regional integration takes the net gains of one country's integration strategy and effectively shares those efficiencies with its trading partners. In doing so, regional trading partners are working together to reallocate resources throughout the region and further integrate oftentimes disparate suppliers and consumers between countries. The importance of regional integration was highlighted in the IDB project *Initiative for the Promotion of Regional Public Goods: Improving Public Administration through E-Government Best Practices (RG-T1153).* This project illustrates the common theme of data sharing to improve transparency and effectiveness. Whether that data be used to improve operations at the border or internally in public administration, the resultant benefits to regional integration are one in the same.[4]

Foreign Relations

A benefit of improving export trade facilitation through the ICNCP project is better foreign relations through increasing foreign trade with fewer restrictions. Foreign relations will also improve with the implementation of ICNCP project as improved supply chain performance attracts more foreign direct investment (FDI) and integrates international production supply chains by facilitating just-in-time inventory schemes. Without FDI, no country can be fully

[4] IDB (2005). *Initiative for the Promotion of Regional Public Goods: Improving Public Administration through E-Government Best Practices (RG-T1153)*

competitive and immersed in the global marketplace, and opportunities for national alliances are lost.

2.3.2 Environmental Impacts

The ICNCP project is not expected to have any material impact on the environment. This project does not involve major construction efforts nor does it generate emissions into the air or water. In general, deploying and implementing the ICNCP project design does not result in conditions that pose problems or undesirable effects to personnel. Documented below are the results of the Impact Assessment conducted by the Unisys Team on the potential environmental impacts and mitigation strategies to be enacted by the SEP along with other Brasilian logistics chain partners.

Potential negative impacts

Elements of improving and optimizing supply chain processing could have a negative environmental impact. Most prevalent of those elements is the use of technology hardware to implement the automated systems, data storage banks, and communications links to manage the system. While most of these negative impacts are offset by the environmental gains of optimized supply chain logistics, these potential negative aspects should be considered and mitigation strategies implemented whenever possible.

In conducting the Impact assessment, the ICNCP project has shown to includes the following elements:

Inefficient use of energy

Computers and office equipment play an increasingly large role in energy consumption aspect of any large systems integration initiative. Computers, scanners and other electronic technology account for a fast growing source of energy consumption. A recent report by the Gartner Group, the industry analysts, said the global IT industry generated as much greenhouse gas as the world's airlines—about 2 percent of global CO_2 emissions. "Data centers are among the most energy-intensive facilities imaginable," said Evan Mills, a scientist at the Lawrence Berkeley National Laboratory in California. Banks of servers storing billions of web pages require power.

Further environmental problems caused by computers include a large amount of energy consumption during the production of computers as well as by the use of computers. "For the manufacturing of a normal computer approximately 30'000 megajoule in energy are used." (Swiss Federal Institute of Technology Zurich).

Generation and release of toxic compounds into the environment

The manufacturing and disposal of computer systems leads to the generation and release of toxic compounds into the environment. At a computer's very core is electronic circuitry, mainly comprised of a larger board (Motherboard), several smaller expansion boards (PCI Cards, RAM, video cards, etc.), and various other parts, including disk drives, chips, and fans. Much of the circuitry on computers is commonly done with lead solder. While each soldered joint is very tiny, as a whole computer, with thousands of resisters, capacitors, and chips, it can turn into a larger amount than one would think. Holding all this together can be as much as 8 lbs of Aluminum. This serves as the frame for the computer's case. Surrounding all that can be as much as 14 lbs of plastic.

The more dangerous effect is the release of toxic chemicals that are used in the manufacture and in the disposal of the hardware. In the manufacturing of just one 8 inch wafer 4,267 cubic feet of bulk gases, 27 pounds of chemicals, 29 cubic feet of hazardous gases and 9 pounds of hazardous waste are given off. The computer display may contain 4 lbs of lead to shield radiation and mercury among other harmful chemicals. LCD's, which are becoming more popular among new computers, while they don't have the lead, they still have the mercury to make them work. All the chemicals and toxins that are released often end up polluting ground water and harming people's health. Even cleaning agents for computer equipment (such as chlorofluorocarbons) are bad for the environment.

Potential positive impacts

While there are some negative impacts to a ICNCP, the positive impacts are far greater in number and effect. The importance of these environmental benefits must not be understated given the urgency of climate issues and increasing international concern about emissions and pollution. The ***SMART 2020***[5] report presented findings that ICT could drive efficiency across the economy and deliver emission savings of 15% by 2020.

Reduction in Green House Gases

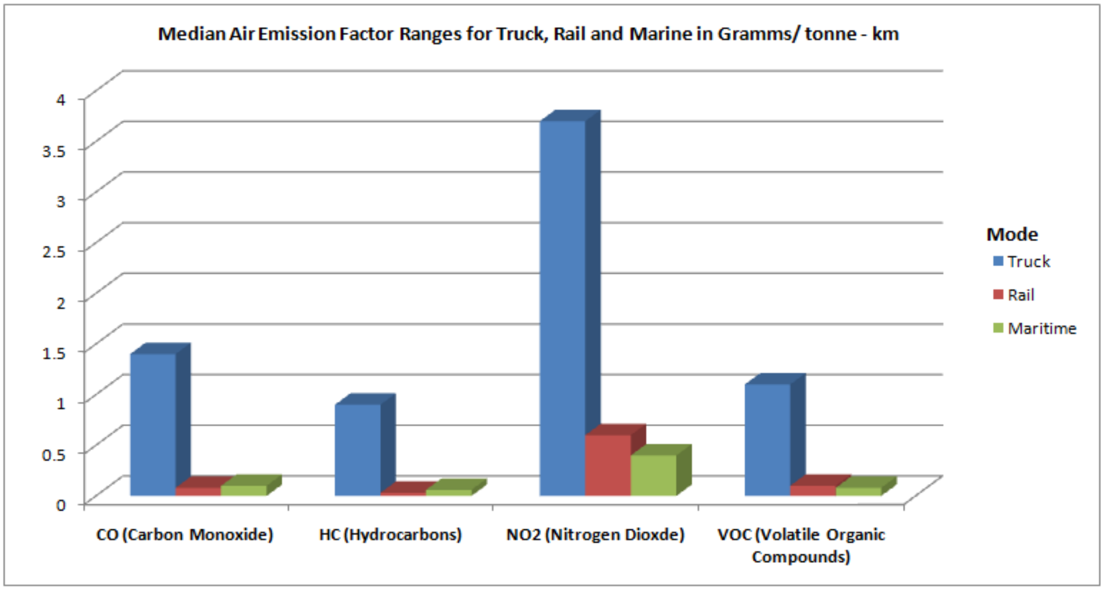
As a result of delays in customs and port clearance processes, large trucks and ships often sit idling at borders and harbors for hours, releasing harmful emissions. ICNCP can greatly reduce greenhouse emissions by reducing this idle time, an action that could help countries comply with global standards, in particular, those of the Kyoto Protocol.

The Organization for Economic Cooperation and Development (OECD) reports in its publication *Reducing Transport Greenhouse Gas Emissions: Trends & Data 2010* that:

- Transport-sector CO2 emissions represent 23% (globally) and 30% (OECD) of overall CO2 emissions from Fossil fuel combustion. The sector accounts for approximately 15% of overall greenhouse gas missions.
- Global CO2 emissions from transport have grown by 45% from 1990 to 2007, led by emissions from the road sector in terms of volume and by shipping and aviation in terms of highest growth rates.
- Under "business-as-usual", including many planned efficiency improvements, global CO2 emissions from transport are expected to continue to grow by approximately 40% from 2007 to 2030 – though this is lower than pre-crisis estimates.

[5] www.smart2020.org/_assets/files/03_Smart2020Report_lo_res.pdf

* Road sector emissions dominate transport emissions with light-duty vehicles accounting for the bulk of emissions globally. In certain countries for which estimates can be made, road freight accounts for up to 30% to 40% of road sector CO_2 emissions though the breakdown amongst freight vehicle classes varies amongst countries. Emissions from global aviation and international shipping account for 2.5% and 3% of total CO_2 emissions in 2007.



While docked (for light, heat, ventilation, etc.) ocean-going vessels emit GHG that are more likely to affect adjacent populations than at sea. Even small reductions in waiting time in the supply chain can make a significant reduction in CO_2 emissions.

Reduction in paper consumption

Despite predictions that the spread of information technology would reduce paper consumption, 90-95% of business information is still stored on paper. Business and government rely heavily on paper to perform everyday duties, despite the high cost associated with lost documents, risk of document obsolescence and labor inefficiency. For example, the average office worker disposes of 100 to 200 pounds of office paper per year.

In conducting the Impact Analysis, the Unisys Team observed that, reducing paper usage through deployment of the ICNCP project will provide the following environmental and economic benefits:

* Fewer natural resources will be used for the production of paper
* Air and water emissions from the production of paper will be reduced
* Less space will be needed for the management and storage of paper documents
* Less money will be spent on purchasing paper

- Savings will be found by utilizing less supplies and proper maintenance of printers and copiers
- Less paper waste will be accounted for, lowering our costs for recycling and disposal, and reducing our impacts on the municipal waste stream

Reduction in energy consumption
Accelerating the transport of goods through the logistics chain will reduce energy consumption by:
- Reducing fuel costs per container movement
- Limiting the need for multiple trips to different agencies to obtain cargo clearances
- Reducing dwell time for ships and trucks waiting for clearance
- Reducing the energy needed to construct and maintain larger physical facilities to accommodate increased trade

Reduction of the impact from growth of port infrastucture
Port congestion is an increasing problem for SEP and the country of Brasil. Expanding currentr infrastructre and building new faciliaties such as berths, warehouses, inland channel construction; and adminsitrative offices is the usual response to these increased volume demands. By implementing the ICNCP project and other similar initiatives, the need for that new infrastructure is at least delayed if not eliminated.

Reduction in water and other pollution
With the increased dwell time of vessels at Brasilian ports, due to inefficient operations, the ICNCP project will help reduce the pollution from ocean freighters from sources such as the following:
- Routine discharges of oily bilge and ballast water from marine shipping
- Dumping of non-biodegradable solid waste into the ocean
- Accidental spills of oil, toxics or other cargo or fuel at ports and while underway
- Air emissions from the vessels' power supplies
- Ecological harm as a result of the possible introduction of exotic species transported on vessels

Reduction in solid waste disposal
With the reduction in paper usage and limiting the wait time for staff, machine operators, drivers and other personnel the production of waste from trash will also be reduced. With faster turn around time, the number of shipping pallets needed will be reduced since they will not be as necessary for storage. Reducing the number will reduce the levels that end up in land-fills.

Reduction of congestion around the port
By accelerating the export clearance times the general congestion in and out of the port of people, cargo and equipment will be more orderly and timely. Wait times, grid lock, accidents, and breakdown

of equipment will be reduced. Each of these, while small in individual impact, when aggregated into a week or month's activity, will provide a significant positive impact on the region's environment by reducing dust, trash, debris, litter, and gas emissions.

Strategies to Reduce negative environmental impacts

The ICNCP project presents a unique opportunity to not only improve the logistics chain efficiencies but at the same time, improve the overall security posture of the export containerized cargo by providing visibility to the movement of the cargo and information. This project can be implemented with a small negative environmental footprint and this section discusses the extent to which these negative impacts can be mitigated in anticipation of the ICNCP project moving forward to the implementation stage. Documented below are some of the mitigation strategies, the Unisys Team was able to develop in response to the negative impacts outlined above:

Lower energy consumption

Although energy consumption is rising, there are various methods that can be employed to increase energy efficiency. Many organizations and institutions have implemented green procurement policies that promote the purchasing of energy efficient products and the adoption of energy saving practices. These energy saving practices do not reduce the performance of the computers, they simply reduce their power consumption when not in use. Most energy savings are derived from low power or 'sleep' modes that occur when the computer is idle. Green procurement policies also require an assessment of the environmental impacts of products through all stages of their lifecycle (cradle-to-cradle). An important element of this assessment is determining the end-of-life disposal techniques available for various forms of office equipment, especially computer monitors containing lead bearing cathode ray tubes (CRTs). Most computers manufactured today also consume less power thanks to government efforts to get computers to support low powered mode (e.g. US Dept. of Energy).

Manufacturing smaller carbon footprint hardware and reducing waste

Using green technologies to produce ICT equipment reduce the negative impact on the earth compared to making conventional computers in terms of greenhouse gas emissions, waste and pollution emitted into the environment, and resources saved by using post-consumer materials. For example, some of these green technologies include the use of refurbished parts or computers, the use of recycled materials, in particular plastic, and lead-free solder, and finding alternatives to lead.

Participation in organized mitigation initiatives

In 2007, Microsoft collaborated with a number of well-known companies and organizations to launch the Climate Savers Computing Initiative (CSCI). Through CSCI, Microsoft and its partners offer a unified voice on the importance of sustainable computer use. In addition, CSCI offers clear guidance to individuals and businesses on how to take advantage of industry innovations and best practices that improve energy efficiency and power management. Inspired by World Wildlife Fund's Climate Savers program—which, since 1999 has helped more than a dozen companies reduce carbon dioxide emissions and has shown that emissions

reduction is good business—CSCI was founded as a nonprofit group of consumer, businesses, and conservation organizations in 2007. CSCI aims to promote development, deployment, and adoption of smart technologies that streamline power delivery to computers and reduce the amount of energy that computers consume.
Hardware and software manufacturers like Microsoft who participate in CSCI commit to the production of products that meet specific power efficiency targets. CSCI provides resources to consumers and IT professionals, who want to learn more about power management, including:

- Information that increases awareness about the environmental and economic impact of power management.
- Prescriptive guidance on how to take advantage of sustainable computing products that are already in the marketplace.

2.3.3 Regulatory and Other Institutional Reforms

Brazil is the largest country in South America, and the fifth largest country, in terms of geographical size, worldwide. Its population, which currently adds up to over 180 million inhabitants, as well as most of the goods produced in Brazil, is concentrated in the southeast region.

From a recessive country in the 1980's, Brazil has commenced a new era in its economy since the early 1990's, when new policies were carried out in order to (i) achieve economical and political stabilization, (ii) open up the economy to international trade and investment, and (iii) normalize relationships with the international financial community. The latter two were quickly achieved: import tariffs were reduced, and substantial restrictions were eliminated. In 1992, Brazil reached an agreement with both public and commercial creditors to reschedule its foreign debt payments, exchanging old debt for new bonds. This rescheduling marked Brazil's return to the international financial markets.

Additionally, some of the most important measures undertaken during this period were the execution of the Privatization Plan, which made various profitable business possibilities available to foreign investors and provided the Federal Government with material resources to implement some of the necessary social, political and economical changes.

The turning point in the stabilization process, however, came with the successful launching of the "Real Plan", in June 1994, which had as its goals: (1) control and reduction of the then ongoing hyperinflation; (2) steady and substantial reduction of social imbalances; and (3) long-term sustainable growth of GDP, investment, employment and productivity.

As a result, since 1994 price increases have been the lowest in the last four decades, down from more than 2,100 percent in 1993 (immediately before the launching of the Plan), which reflected on the increase of industrial productivity, to an average of 7 percent a year in the late 1990's. Since the middle 90's we have not seen any direct interference by the Federal Government in the economy by means of economic plans, a very frequent practice in the prior decades. As a result of that we have seen a much more stable economic environment, with monetary and fiscal policies along the lines of those followed by the majority of G-7 economies.

Currently, Brazil ranks among the 12 biggest economies worldwide.

Brasilian Legal System
Brazil adopts the civil law system. Accordingly, contrary to the common law system used in the U.S., the Brazilian legal system is based on codified law and on the enforcement of prevailing laws and not on judicial precedents or the analysis of analogous cases, as in Anglo-Saxon countries.

The Federative Republic of Brazil is composed of the Federal Union, the States, the Municipalities and the Federal District. All members of the Federative Republic may issue laws within the limits established for each legislative authority by the Federal Constitution. The Federal Constitution provides that the Federal Union, the States, the Municipalities and the Federal District cannot enact laws that are contrary to the Constitution. The official language is Portuguese.

The form of government adopted is presidential and the President of the Republic is the head of the Executive Branch. The Legislative Branch is represented at the federal level by the National Congress, composed of two different chambers: the Senate and the House of Representatives. Members of the House of Representatives are elected by the people, while the Senate represents the federal units (States). The Judicial Branch has as its highest bodies the Federal Supreme Court and the Supreme Court of Justice. Voting is mandatory and follows the absolute proportional system with no division of the regions into electoral districts.

The Brazilian Constitution currently in force was enacted in 1988 and since then it has been the object of more than 40 amendments.

Brasilian Tax System
Brazilian Tax System is mainly governed by the Federal Constitution, the Brazilian Tax Code, complementary laws, ordinary laws, resolutions of the Federal Senate, State laws and Municipal laws.
The Federal Constitution determines tax jurisdictions applicable to the Federal Union, States and Municipalities, all of each are authorized to create taxes to be levied upon the occurrence of different events, within their respective competence and in compliance with the applicable constitutional principles.

Tax Overview

- Taxes on Profits: Profits of Brazilian companies are subject to Corporate Tax (IRPJ) and Social Contribution on Net Profits (CSLL). IRPJ is due at the rate of 15% and a surplus rate of 10%. CSLL is charged, in general, at a 9% tax rate.
- Taxes on Revenue: The Contribution to the Social Integration Program (PIS) and the Social Security Financing Contribution (COFINS) are social contributions levied on monthly revenues earned by the companies and they are calculated based on the cumulative or the non-cumulative regime (which admits tax credits on some costs and expenses expressly determined by law). PIS is charged at the rate of 0.65% under a cumulative regime or 1.65% under a non-cumulative regime and COFINS is charged at the rate of 3% or 4% (for financial

institutions) under a cumulative regime or 7.6% under a non-cumulative regime. Revenues related to export of goods and services are exempt from such taxation, if the payments of these services represent inflow of funds to Brazil.

- Tax on Manufactured Products: Excise Tax (IPI) is levied on finished goods (national and foreign finished goods). For IPI purposes the following taxable events can be distinguished: (i) the custom clearance of foreign finished products; and (ii) the shipment of finished products from an industrial or similar establishment. It is normally calculated on (i) the basis of the customs value plus import duties, when related to import transactions, and (ii) on the price of the output (within domestic market). The applicable rate may vary according to the classification code of the product. As a general rule, IPI is a non-cumulative, value-added tax, meaning that the amount charged in each successive taxable transaction is deducted from current transactions, i.e., the collected IPI on imported goods generates a tax credit which may be offset in subsequent transactions. As a general rule, export transactions are exempt.
- Import Tax: Import Duty (I.I.) is levied on the importation of goods and collected at customs clearance. It is calculated on the basis of the customs value (e.g. CIF value-cost + insurance + freight) and it is taxed at a specific rate according to the imported good classification and its jurisdiction of origin. It is not recoverable and is therefore considered to be an effective import cost which does not generate any tax credits.
- Export Tax: Exported goods are, in general, free from taxation. The Export Tax (I.E.) is levied on the following goods: cashew nuts, leather and furs, tobacco paper and other raw materials for cigarettes, weapons and ammunition.
- Value Added Tax: State Value Added Tax (ICMS) is imposed on (i) sales of goods; (ii) inter-municipal and inter-state transportation services; and (iii) communication services. It is calculated, as a general rule, on the basis of the value of the transaction or the price of goods and services rendered. ICMS rates may vary depending on the goods or the services transacted, as well as on the specific regulations of each State (the average rate is 18%). ICMS is similar to the VAT adopted in European jurisdictions. ICMS is also levied even if the transactions and rendering begin abroad. For the import of goods, generally the basis for calculation of the ICMS is the product's customs value increased by I.I., IPI, PIS-Import, COFINS-Import and customs expenses. Exports are exempt from ICMS. Under certain conditions, the ICMS legislation provides tax incentives for companies established in determined areas, as an exemption or a reduction of the ICMS rate, financing ICMS tax payments, application of deferral system payment and others. Those incentives vary from State to State and depend on special rules determined by the States legislation.
- Tax on Services: Tax on Services (ISS) is a municipal tax levied on general services, which are not subject to ICMS taxation. It is calculated on the basis of the service fee charged by the service provider and the applicable rate may vary from to 2% to 5% according to the local (municipal) legislation in which the provider is located or the service is rendered. ISS is also due on the import of services and the contracting party in Brazil is held liable for the collection and payment of the tax.
- PIS and COFINS on Import of Services and Goods: Contribution for the Social Integration Program levied on imports (PIS-Import) and Social Security Financing Contribution levied on imports (COFINS-Import) are generally levied on the entrance of foreign goods in the Brazilian territory on importation of services. Such contributions are due at the combined rate

of 9.25%. In certain cases, PIS-Import and COFINS-Import can generate credits in line with the non-cumulative system of PIS and COFINS.

- Others: Taxes on Financial Transactions (IOF); Contribution for the National Institute of Social Security (INSS); Tax on Urban Property (IPTU); Real Estate Transfer Tax (ITBI), etc.

Required modifications to Brasil's transportation and logistics regulatory regime

Considering the ICNCP project and its design, the Unisys Team verified that the relevant Brazilian rules currently in force which may impact the project are:

- Brazilian Customs Regulation
- REPORTO regulation
- Foreign Trade Secretariat Ordinance No. 10/10.

In this regard, the Unisys Team has briefly described the main provisions analyzed in order to verify whether there is any legal barrier that may impede the implementation of the project, considering the export of containerized cargo from Brazil. Please note that only the main provisions are mentioned due to the extension of the analyzed legislation, e.g. 820 provisions of Brazilian Customs Regulation and 256 provisions of Foreign Trade Secretariat Ordinance No. 10/10 .

Brazilian Customs Regulation

Regulates the foreign trade transactions in Brazil, setting forth mainly the following:

- Customs Jurisdiction and Vehicles Control
  - Customs territory is defined by legislation as the national territory and it is divided into a primary zone – where customs services take place - and a secondary zone. Additionally, as an exception, the authorities may delimitate in specific areas a customs surveillance zone, in which goods, people and vehicles must observe the requirements, prohibitions and restrictions established by legislation.
  - Ports, airports, frontiers points, customs warehouses and dry ports are primary zones in order to enable foreign trade transactions.

- Vehicles Customs Control
  - As to the entrance and exit of foreign vehicles, Brazilian legislation provides that it can only occur in ports, airports and customs frontiers. Such vehicles will be controlled from their entrance until their exit, as well as the goods transported by them.
  - Additionally, the carrier must provide information as to the goods transported to Brazilian Federal Revenue Secretariat (RFB), observing some terms and conditions.
  - As to containers, in Brazil their entrance and exit are free. They are automatically subject to Temporary Admission Special Customs Regime and, according to Brazilian legislation, some information may be requested by the authorities for customs control purpose.
  - Legislation also provides (i) the rules that must be observed as to the documents related to the carrier and the cargo, such as Bill of Lading (B/L), invoice, etc.; (ii) the information that must be provided by the carrier to RFB.

- Export Tax and Export Tax Incentives
  As previously mentioned, exported goods are, in general, free from taxation. Additionally, it is important to mention that Brazilian legislation provides a specific tax treatment which is applicable to operations carried out with "export specific purpose", once the established requirements are observed.

- Export Customs Clearance
  - Through the export customs clearance the authorities verify the accuracy of the information provided by the exporter regarding the goods and documents presented, aiming at releasing the goods.
  - The Export Registration (RE) corresponds to the totality of information which characterizes the export transaction and defines its framing. RE is an essential requirement for the export customs clearance and must observe the formalities provided by legislation.
  - The Export Declaration (DE) is the basic document for the customs clearance and it must be presented to the authorities with the main documents related to the cargo and its transportation.
  - The export inspection performed by customs authorities intends to
    - identify the exporter
    - verify the goods and the accuracy of the information provided
    - confirm the compliance to the required obligations.
  - The export customs clearance indicates the conclusion of the export inspection and the authorization of shipment. The shipment annotation confirms the exit of the good.

- Proceedings Control and Declarations
  RFB is responsible for the tax proceedings and the declarations related to foreign trade transactions. Additionally, it is important to mention that activities related to containerizing and de-containerizing cargo carried out in the primary zones must be done by agents authorized by RFB, observing the terms and conditions established by legislation.

  - Technical Inspection and Technical Assistance

  The technical inspection of the goods and the analysis of the security equipments and the computerized systems will be carried out by RFB and the authorized entities.

REPORTO

Tax Regime with Incentives for Modernizing and Amplifying the Port Structure

- Law 11,033/04
- Decree 6,759/09
- Normative Instruction 879/08

II, IPI, PIS/COFINS-Import and PIS/COFINS – Suspension in domestic sales and import of machinery, equipments, spare parts and other goods for inclusion in fixed assets, to be utilized exclusively in activities in connection with port services (e.g., load and unload services, transporting goods and dredging, and in employees training programs)

REPORTO is a tax regime created to encourage the modernization and expansion of the port structure in Brazil . Once the requirements provided by legislation are observed, such regime allows the suspension of payment of I.I., IPI, PIS-Import and COFINS-Import levied on the import of machines, equipments, spare parts and other goods imported directly by beneficiaries of the regime for inclusion in fixed assets to be utilized exclusively in activities in connection with port services, e.g. loading, unloading, handling cargo and dredging, and implementation of education and training of employees. The suspension of payment of taxes becomes a tax exemption after the expiry of five years from the date of the triggering event.

- The beneficiaries of REPORTO may be, among others, the port operator, the operator of an organized port, the dredging companies, the licensees or permits customs facilities for secondary zone.
- As to such regime, it is important to emphasize that it focuses mainly in the tax exemption on the acquisition of machines and equipments destined to the modernization of Brazilian ports for them to achieve the international standards related to the moving of cargo.
- Accordingly, it is possible to affirm that it represents a big challenge to Brazilian ports, considering that REPORTO intends to motivate (i) the modernization of the transactions management; (ii) the reduction of bureaucratic proceedings; and (iii) the rational and planned utilization of the ports facilities.
- In this regard, REPORTO represents an opportunity for the replacement of the ports' machines and equipments, once the regime reduces significantly the costs of assets which are so important and relevant to increase the foreign trade operations in Brazil.
- In this context, we may conclude that ICNCP To-Be solution, especially regarding the export of containerized cargo from Brazil, is in accordance with REPORTO intention once the project intends to integrate and computerize the information related to the foreign trade transactions. Additionally, please note that, as ICNCP does not imply in any substantial change in the legal proceedings, REPORTO regulation does not represent any legal barrier that may impede the implementation of the project.

Foreign Trade Secretariat Ordinance No. 10/10: consolidates the foreign trade transactions rules.

2.3.4 Institutional reforms to implement the ICNCP Project

In this regard, based on the analysis of referred rules, the Unisys Team verified that the ICNCP project, especially regarding these transactions (export of containerized cargo from Brazil), does not imply in any substantial change in the legal proceedings and it only integrates and computerizes the information related to the foreign trade transactions. Accordingly, we conclude that there is no legal impact in the implementation of the project and it is in accordance with Brazilian legislation.

Nevertheless, we recommend a Special Regime in order to (i) address specific issues to the authorities; and (ii) reduce possible restrictions that may be verified in practice.

2.3.5 Development and Operating Funding Alternatives

A primary goal of ICNCP is not only to streamline the operations of Export containerized cargo from Brasil but be a platform to share cargo information across multiple entities, thereby enhancing the security of the cargo. Creating and developing one system to manage all export processes is less costly than having each agency create and maintain its own system and hence from our analysis, there are several business models that can be used for ICNCP funding.

Funding alternatives

The United Nations Economic Commission for Europe (UNECE) maintains a repository of Single Window systems in the World.[6] In a survey it conducted by the Unisys Team, of 16 countries that have implemented systems similar to ICNCP, those models were identified as examples to other countries considering implementing similar systems.

Figure: ICNCP Project Funding Alternatives

Funding of an intelligent port logistics chain project in Brasil is potentially available from several sources. Some of those alternatives for funding the development and operation of Brasil's new intelligent cargo and port logistics chain environment include Private sector participants in the logistics chain: transportation and logistics service providers, and shippers, In-country development banks and International development banks and global institutions

Self Funding

As import duties phase down under global or free trade agreements, the need to maintain revenue levels for the operation of government agencies becomes more visible as a policy matter. By moving goods more quickly in and out of the country, the volume of border transactions

6 www.unece.org/cefact/single_window/welcome.htm

increases along with the revenue collected from those transactions. Processes to support this policy need to be in place to ensure the collection, retention, and administration of that revenue in the context of better border management. This increased revenue could allow funding from the Brasilian government budget.

In addition to utilizing revenue generated via taxes and tariffs, the Brasilian government through the Infrastructure Plan (PAC & PAC2) could fund the project, which would make this a self sustained and financed project in line with other infrastructure investments being made by the Brasilian government. In conducting an analysis, the Unisys Team observed that the port sector was included in the PAC & PAC2 plans with a core focus on the following focus areas:

- Dredging of the navigation channels at key Brasilian ports
- Port Infrastructure
- Logistics Intelligence Systems
- Passenger terminals to process traffic for the World Cup in 2014

In speaking with representative from the "Casa Civil" who shared the presentation referenced below, the ICNCP project could be funded using the PAC 2 funding allocated as per Brasilian law.

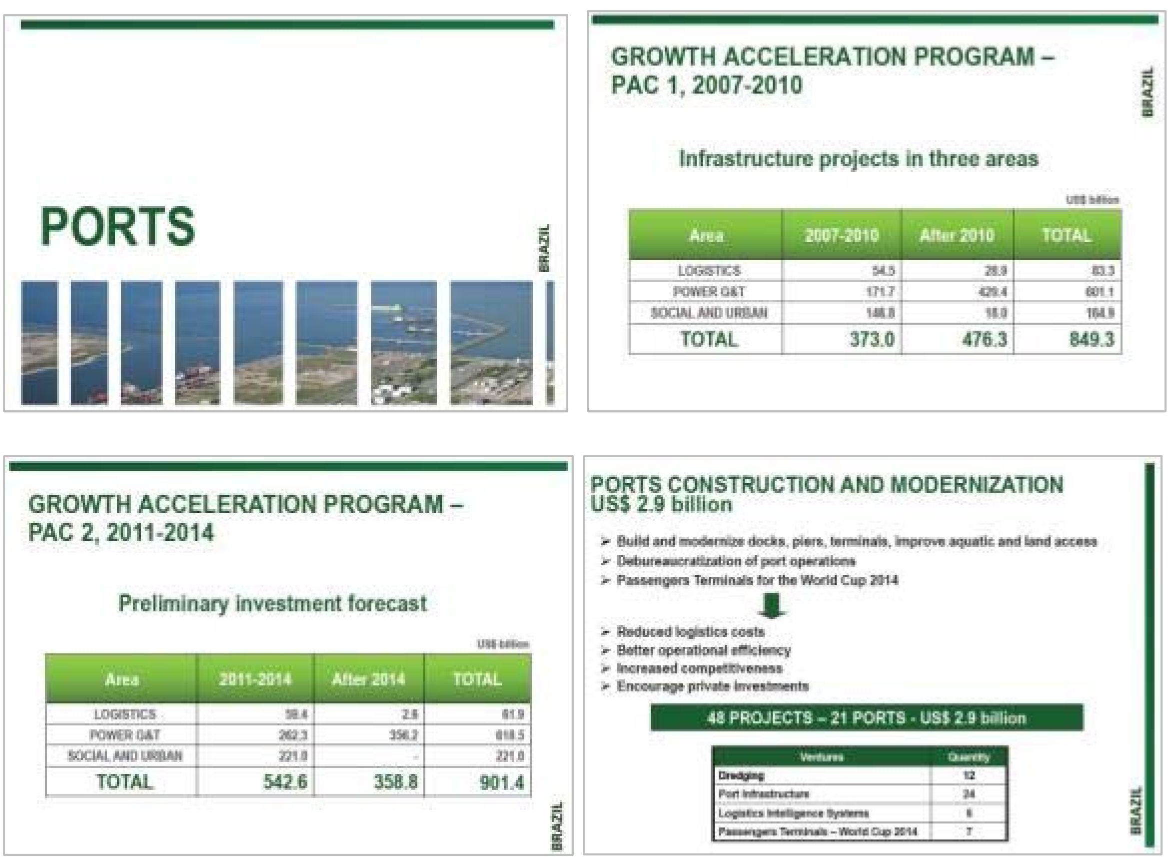


Figure: Brasilian PAC Port Funding Strategy

Depending on the scope and pace of deployment of the ICNCP, the project could be funded through contributions from each of the participating agencies and/or through incremental increases in that funding. The scope of this review does not include an assessment of what those additional costs could be. That should be a component of the follow-on studies tied to implementation strategies.

A second source of funding is BNDES, the Brasilian government's national development bank. It has the mandate to foster development through funding of logistics and technology projects.

Loans and Grants via Multilateral and Bilateral Funding
Multilateral Development Banks are institutions that provide financial support and professional advice for economic and social development activities in developing countries. The term Multilateral Development Banks (MDBs) typically refers to the World Bank Group and four Regional Development Banks. The Inter-American Investment Corporation, the International Finance Corporation, and the U.S. Export-Import Bank are examples of international funding sources.

Specifically, the U.S. Export-Import Bank (Ex-1m) also does not compete with private lenders, but provides products to "fill in the gaps in areas of trade and structured financing." It guarantees or insures loans to international buyers of U.S. capital goods and services. It also provides direct loans to buyers. Depending on the country, short (up to one-year repayment), medium (up to five years and under $10 million), and long-term (up to ten years or over $10 million) financing is available. The Ex-1m Bank has a specific program to invest in transportation security projects. Several other banks and funds that lend to developing countries relevant to Brasil are:

- The European Commission (EC)
- The European Investment Bank (EIB)
- International Fund for Agricultural Development (IFAD)
- The Nordic Development Fund (NDF)
- The Nordic Investment Bank (NIB)
- The OPEC Fund for International Development (OPEC Fund)

The Unisys Team contacted these financial institutions and with the help of USTDA, was able to set up introductory meetings with some of them to introduce the project and discuss their guidance on funding options for the ICNCP project.

Private Sector through Public-Private Partnerships (PPP)
Logistics Chain partners would also be interested in making an investment, however private sector investment would be contingent upon the type of equipment deployed. Shippers, trucking companies, railroads, and ocean carriers are all potential candidates to provide the required mobile hardware and each would do so if the benefits were evident.

One example of a PPP is the experience of Mauritius as it implemented its import-export single window. The government engaged the company *Mauritius Network Services (MNS)* to develop its automated system. The PPP created TradeNet as a joint venture company owned by MNS financed through equity provided by public and private shareholders. Through its compulsory use requirement, it represents a monopoly of the customs border management service within the economy of Mauritius. Costs at the outset of the project included staff, equipment and software for customs and the establishment of MNS TradeNet. Current running costs include system maintenance and updates, staff salaries, and communications. One key to the success of the TradeNet program is the focus on self-sustainability since the outset of the project. Because of the registration and usage charges to clients, MNS has been able to use its own resources to finance further investments and activities. It's financing and fee schedule include:

- Joint-venture functioning 100% as a private concern
- Equity (± USD 1 million) provided by shareholders
- Self-sustainability perspective right from the start
- Highly successful and profitable activity:

Collection of User Fees and Charges

There are a number of examples of government systems that are self funding through users fees and charges. One successfully implemented is Senegal's. The government established a Committee for the Management of Customs Computer System (CGPID) to run Senegal's customs computer systems and develop its successful single window project. It is based upon user fees to access the system. Initial funding to set up the Gainde ORBUS system came from the Government and the CGPID. Examples of the fees being charged in Senegal are:

- Connection: 200 USD (once at sign up)
- For each transaction: 4 USD
- For each document: 2 USD

Another example is the U.S. where there is an *ad valorem* import Merchandise Processing Fee with a minimum and maximum applied to most imports that is used to partially fund the Automated Commercial Environment (ACE) system. The minimum is US $21 and the maximum, US $400.

Build-Operate-Transfer (BOT)

BOT is a form of project financing, wherein a private entity receives a concession from the government to finance, design, construct, and operate a facility or system as stated in the concession contract. This enables the project developer to recover its investment, operating and maintenance expenses in the project. Usually because of the long-term nature of the contract, most of the development fees are raised during the concession period. The rate of increase is often tied to a combination of internal and external variables, allowing the proponent to reach a satisfactory internal rate of return for its investment. Traditionally, such projects provide for the infrastructure to be transferred to the government at the end of the concession period. This alternative lends itself to the type of funding provided by the IFC.

Potential sources to support the project

To better support the implementation phase of this project the Unisys Team not only identified potential funding sources but asked to meet with officials with the most relevant sources to determine the efficacy of funding the ICNCP pilot and full implementation. The results of the meetings and the officials the Unisys Team met with are included below in the discussion of each funding source.

In a review of similar projects the Unisys Team determined that even using the public private partnership approach to funding, the immediate costs associated with the purchase of advanced technology and other fixed assets were offset by loans from various lending institutions, such as the IDB. In Guatemala, for example, initial investments in hardware were paid by loan from the IDB, and have resulted in an efficient system now financed by the public sector. The initial investment for its Single Window in Macedonia was provided by USAID and the government of Macedonia, but the system will be sustained solely by the state budget. In the United States, New Zealand, Finland, and Sweden, their initiatives are funded by the government but in these countries while the services do not have the same user fees or service charges as the public-private partnerships, they do collect taxes or fees for advanced services. Additionally, Sweden is beginning to use a public-private partnership for the development of new initiatives. It is evident from an analysis of existing systems that obtaining funding for ICNCP is possible through the use of many different models that reflect country-specific goals and capabilities.

International Finance Corporation - Investment and Infrastructure Department

The International Finance Corporation is another source of funding. IFC provides loans, equity, structured finance and risk management products, and advisory services to build the private sector in developing countries. The IFC limits the total amount of its debt and equity participation for a single new project to a maximum of 25 percent of the total estimated costs. It does not compete with private sector lenders. The contact information of the point of contact at the IFC is listed below

International Finance Corporation (IFC)		
No.	**Focus Area**	**Details**
1.	Name	Renata Norato
2.	Department	Infrastructure Department
3.	Phone	(w) +55-11-3525-6336 (mobile): +55-11-9113-0064
4.	Email	rnorato@ifc.org
5.	ICNCP project meeting date	Aug 26, 2010

Table: IFC Point of Contact Info

The International Finance Corporation (IFC) works to promote private sector investments by both foreign and local investors. It provides advice to investors and businesses, and it offers normalized financial market information through its publications, which can be used to compare across markets. The IFC also acts as an investor in capital markets and will help governments privatize inefficient public enterprises.

Although IFC is primarily a financier of private sector projects, it may provide finance for a company with some government ownership, provided there is private sector participation and the venture is run on a commercial basis. Although IFC does not accept government guarantees for its financing, its work often requires close cooperation with government agencies in developing countries.

IFC takes equity stakes in private sector companies and other entities such as financial institutions, and portfolio and investment funds in developing countries. IFC is a long-term investor and usually maintains equity investments for a period of 8 to 15 years. When the time comes to sell, IFC prefers to exit by selling its shares through the domestic stock market in a way that will benefit the enterprise, often in a public offering. IFC operates on a commercial basis. It invests exclusively in for-profit projects and charges market rates for its products and services.

To ensure the participation of other private investors, the Corporation generally subscribes to between 5 percent and 15 percent of a project's equity. IFC is never the largest shareholder in a project and will normally not hold more than a 35 percent stake.

IFC's equity investments are based on project needs and anticipated returns. The Corporation does not take an active role in company management. IFC risks its own capital and does not accept government guarantees. However, to meet national ownership requirements, IFC shareholdings can be treated as domestic capital or local shares.

Relevant to the ICNCP the IFC also provides Advisory Services for the development of Public-Private Partnerships. In anticipation of using the IFC funding alternative, Brasil may want to take advantage of those services to determine the feasibility of creating a jointly owned company to operate the ICNCP.

Inter-American Development Bank (IDB)

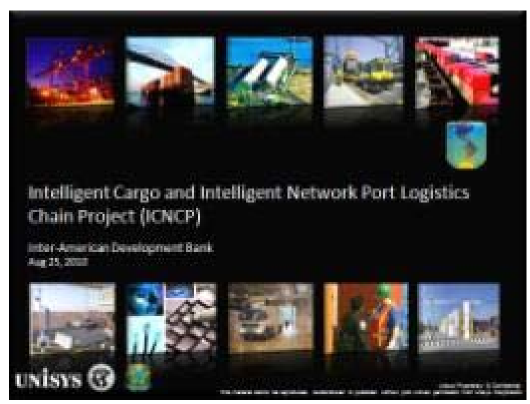
Established in 1959, IADB is the largest source of development financing for Latin America and the Caribbean, with a strong commitment to achieve measurable results, increased integrity, transparency and accountability. While it is a regular bank in many ways, it also is unique in some key respects. Besides loans, it also provides grants, technical assistance and does research. The contact information of the point of contact at the IDB is listed below

Inter-American Development Bank		
No.	**Focus Area**	**Details**
1.	Name	Pablo Guerrero
2.	Title	Transportation Specialist
2.	Department	Infrastructure and Environment Department
3.	Phone	+1-202-6223-2416
4.	Email	pablogu@iadb.org
5.	ICNCP project meeting date	Aug 25, 2010

Table: IDB Point of Contact Info

The Infrastructure and Environment Sector (INE) of the Bank conceptualizes, prepares, supports the execution and supervises the IDB's operations related to energy, transport, water and sanitation and rural development and natural disasters. Its functions include programs in infrastructure and environment; conducting relevant research and analytical work, best practices and case studies on this area; and providing specialized technical support in borrowing member countries.

The sector works with the country departments to design and execute country and regional financial and non-financial programs and projects and evaluates the development results of such interventions. INE is divided in the Energy Division, the Transport Division, the Water and Sanitation Division and Environment Rural Development and Disaster Risk Management Division. INE also leads IDB's initiatives in the areas of infrastructure and environment, such as biofuels and public-private partnerships, including the Bank's Sustainable Energy and Climate Change Initiative (SECCI). The Infrastructure and Environment Department funds technical assistance projects up to a maximum of $1.5 million. It will fund a pilot program when the pilot is a component of a larger, i.e. $10 million or more, implementation development loan.



World Bank

The World Bank organizes itself into regional groupings. With the assistance of USTDA's Gabrielle Mandel the UNISYS Team met with a group of Bank officials from the Latin and Caribbean Region's sustainable development and global information and communications departments. These groups provide technical expertise and funding for poverty-reduction programs in areas such as health, agriculture, and basic infrastructure. After briefing the Bank officials, Aurelio Menendez explained how the support for Brasil is organized. The contact information of the point of contact at the IDB is listed below

World Bank		
No.	**Focus Area**	**Details**
1.	Name	Aurelio Menendez
2.	Department	Transport Senior Manager
3.	Title	Sustainable Development Department Latin America and the Caribbean Region
3.	Phone	+1 202 473-0009
4.	Email	amenendez@worldbank.org
5.	ICNCP project meeting date	August 31, 2010

Table: World Bank Point of Contact Info

There is a current Country Partnership Strategy (CPS) developed jointly with the Bank that provides for restoring and renewing the country's infrastructure and the development of urban areas are imperative for growth, environmental protection and greater inclusion of the poor in Brasil. Bank support to these sectors during the CPS period will contribute primarily to advancing results under the competitiveness pillar - in line with Government's priority on growth, while also meeting the challenges of the sustainability and equity pillars.

While Brasil's infrastructure compares well with other Latin American countries, it fares less well with international peers. Notably, the quality and efficiency of transport services lags well behind its East-Asian competitors, including China and India. An additional challenge relates to the infrastructure needs of the ever-growing urban and metropolitan areas, in terms of providing basic services to citizens, while avoiding the congestion and spill-over effects of this growth on other aspects of the economy and environment (e.g. water resources, air quality).

As a result the current WB focus is:

- Improvements in multi-modal transport routes and logistics; and,
- Urban transport.

Working the government and civil society, the World Bank develops an action plan known as the Country Partnership Strategy 2008-2011(CPS) to broadly reduce poverty and promote economic development. The CPS describes what support and how much could be provided to a country during a 3-year period. The CPS supports the Government's own development program. In this manner, the CPS is specifically designed to the local conditions in the country and designates funding targets for projects, studies, and other support. In Brasil, the focus of the CPS is on accelerating growth, creating new economic opportunities, and fine tuning the role of the public sector.

The inclusion of the ICNCP in this term's CPS is a Brasilian government decision. One suggestion made during the meeting is to cast the ICNCP as part of a trade corridor that will meet one of the two focus priorities of the CPS. By making it part of a larger project it is more likely to be funded.

2.3.6 Potential Sources of Supply

In keeping with the goals of ICNCP project to balance trade and security and enhance the flow of containerized export cargo, the Unisys Team with guidance from SEP, has focused on developing a To-Be solution that is:

- **Low-tech** - does not employ high tech smart container devices
- **Low-cost** - limiting the amount of investment needed from the public and private sector entities
- **Non-invasive –** leveraging business process and lessons learned with a minimal footprint
- **Practical –** utilizing industry best practices that have been successfully deployed in the past
- **Deployable** - in the short to medium timeframe, minimizing the amount of time needed by the logistics chain partners to utilize the solution in their current operations.

Utilizing high level design requirements mentioned above, the Unisys Team has developed a To-Be solution which is made up of the following components:

- Business Process Enhancements
- Cargo Monitoring Mechanism
- Systems Integration and Information Exchange

Shown below are the high level components of the To-Be Solution

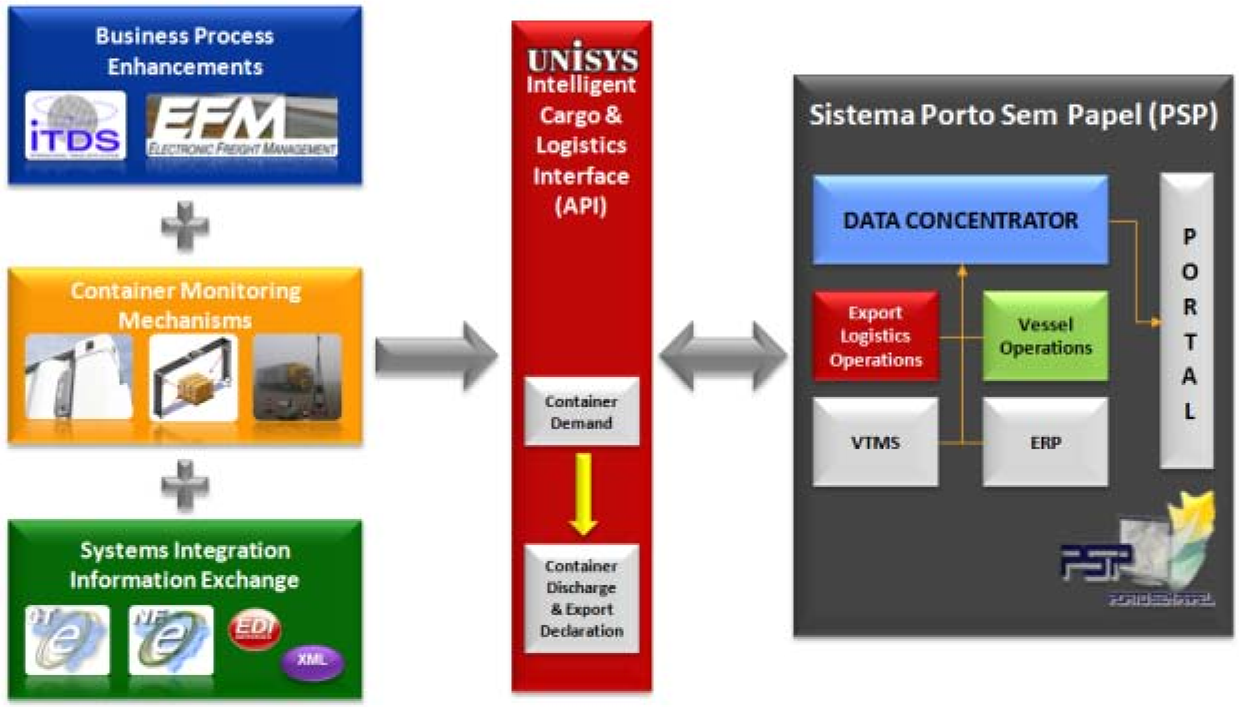


Figure: To-Be Solution high level components

This approach was used, so that the Unisys Team could break the To-Be solution into simple pieces across the Export Logistics chain by:

- Using Industry & International Best Practices
- Utilizing standard based Cargo Monitoring Mechanisms
- Integrating Disparate Logistics Chain data source
- Designing of an Automated Programmable Interface (API)
- Enhancing the existing data model for collection key transactions for Sistema Porto Sem Papel (PSP) Logistics Module

Going beyond the Terms of Reference (TOR) for the ICNCP project, the Unisys Team focused on researching, analyzing and documenting, both the US and Non-US sources of supply for each of the components of the To-Be Solution.

ICNCP Best Practices/ Business Process Enhancements

In surveying logistics monitoring technologies, systems, communications, practices, and procedures throughout the world, the Unisys Team identified and assessed the most valid best practices for intelligent cargo and logistics networks. This effort was conducted with a focus on monitoring capabilities, information sharing between national and international governmental agencies, integration of information across the logistics chain, data timeliness, and data reliability.

With a focus on best practices and business process enhancements, the Unisys Team identified and assessed the best practices for intelligent cargo and logistics networks.
In surveying logistics monitoring technologies, systems, communications, practices, and procedures throughout the world, the Unisys Team identified and assessed the most valid best practices for intelligent cargo and logistics networks. This effort was conducted with a focus on monitoring capabilities, information sharing between national and international governmental agencies, integration of information across the logistics chain, data timeliness, and data reliability.

In analyzing the best practices for assessing the impacts, the Unisys team observed that for better results in project implementations and deployment of key initiatives, sufficient training must be executed for key logistics chain personnel. Training is key to driving efficiencies in operations, technology implementations and reduction of redundant data entry. Each procedure modification or adding of new steps with new technologies, requires training and personnel adaptations.

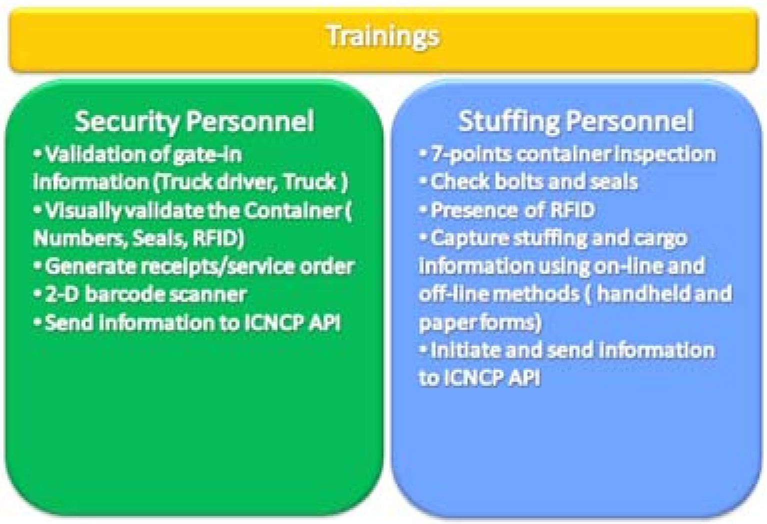


Figure: Necessary training for the Container Stuffing process

Cargo Monitoring Mechanisms

Following the events of 9/11, recognition of vulnerability of the maritime container supply chain to potential acts of terrorism has lead to the increased utilization of several container security technologies both for tracking/ monitoring the location as well as the integrity of the cargo within the maritime container.

For the purposes of the ICNCP project, the Unisys Team utilized the Cargo Monitoring Mechanisms section of the To-Be design to focus on SEP's goals in its seaports, which are to enhance security, efficiency, and effectiveness of the movement of loaded containers from origin to destination by establishing a chain of custody and cargo visibility solution based on the following project objectives:

- All containers must be track or monitored

- All containers should contain electronic seals or other tracking devices
- Containers should be preprocessed on a 24/7 basis before they arrive at the port
- Low-risk containers should be allowed to move swiftly through the system
- High-risk containers must be identified.

The solution designed by Unisys team during Phase 2 of the ICNCP project consists of and is not limited to a RFID tag or label fixed on an export container, antenna and reader deployed at key logistics chain control points. When the said export container is transported past by the fixed or mobile reader, it reads the tag and sends the basic information to the ICNCP API. It will help tracking of containerized assets and allow users to review and collect the tracking history of the export container automatically within a single database, providing visibility and improving logistics chain security.

In keeping with the Terms of Reference (TOR) for the ICNCP project, the Unisys Team focused on researching, analyzing and documenting, both the US and Non-US sources of supply for the following Cargo Monitoring Mechanism solutions:

No.	Focus Area	ICNCP To-be Solution Details
1.	Solution Type	• Passive RFID technology • Active RFID technology • 2D Barcode technology
2.	Deployment Type	• Electronic Seals (eSeals) • Tags
3.	Frequency Type	• Ultra-high-frequency (860-960 MHz)
4.	Functionality	• Read-only • Write-once or OTP (One-Time Programmable)
5.	Reader Infrastructure	• Handheld • Fixed • For the 2D barcode solution the reader can be any camera device with specific software.

Table: Researching Considered Items

Taking into consideration the To-Be Solution requirements, the Unisys Team has profiled the following US and Non-US Cargo Monitoring Mechanism solutions:

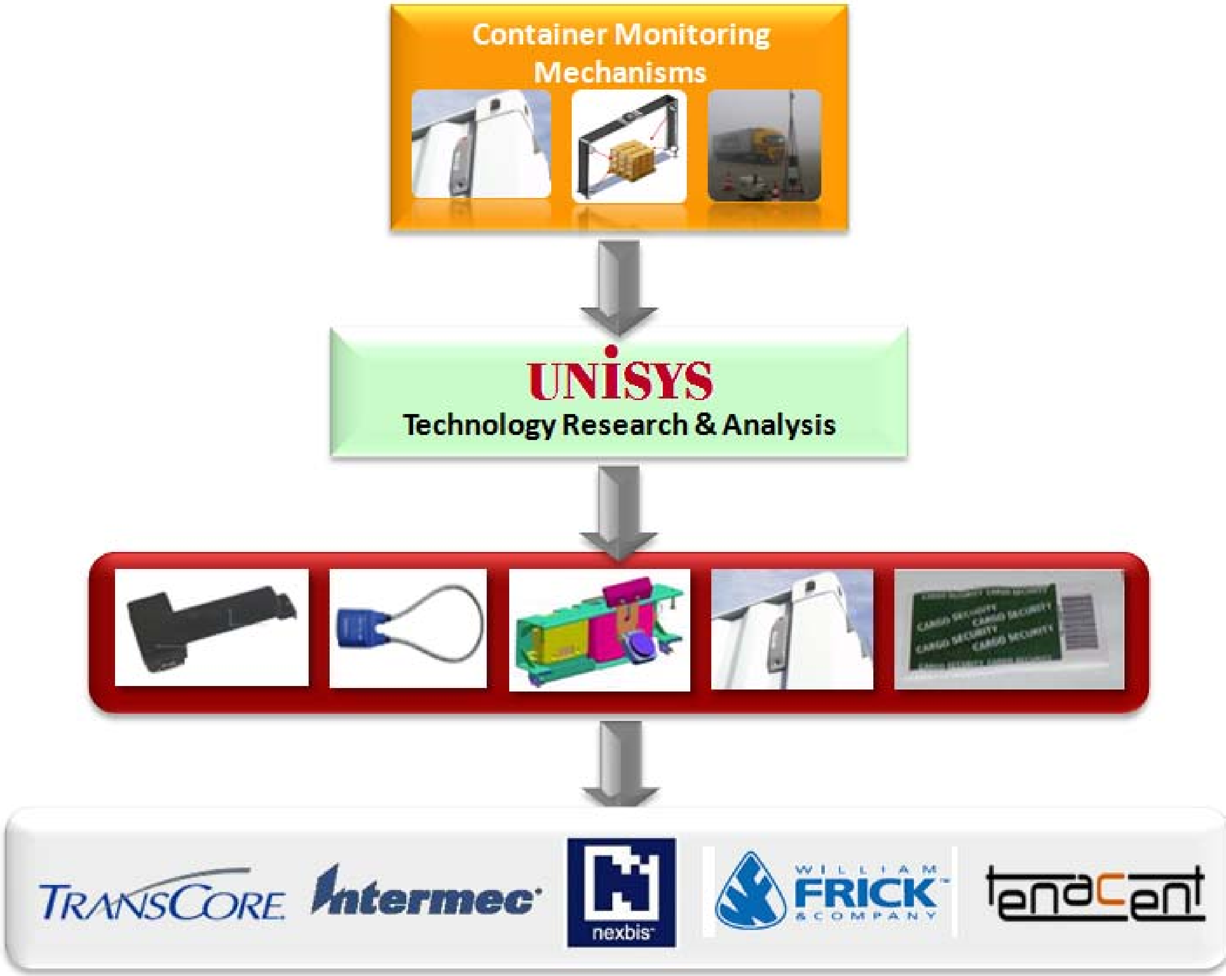


Figure: Unisys Container Monitoring Mechanism Analysis Approach

Each of the solutions shown above have been described in more detail in the section below.

US sources of supply of Cargo Monitoring Mechanism solutions

Frick - RFID Solution

William Frick and Company market reach extends to both domestic and foreign industries. In addition to the labels, decals, nameplates and signs upon which the company was founded its' product line has grown to include SmartMark RFID products, FlexPost ground markers, AuthentiCal security labels and 3D formed nameplates. Frick's close customer relationships have led to many specialized graphics and custom marking products. There are as many unique products as there are applications; customization and problem-solving are their specialties.

<table>
<tr><th>No.</th><th>Focus Area</th><th colspan="2">Details</th></tr>
<tr><td>1.</td><td>Type of Solution</td><td colspan="2">Cargo and Container Tracking</td></tr>
<tr><td>2.</td><td>Solution provider Name</td><td colspan="2">William Frick & Company
http://www.fricknet.com/</td></tr>
<tr><td>3.</td><td>Address</td><td colspan="2">William Frick & Company
2600 Commerce Drive
Libertyville, IL 60048</td></tr>
<tr><td rowspan="3">4.</td><td rowspan="3">Point of Contact</td><td>Name</td><td>Brent Howell</td></tr>
<tr><td>Email</td><td>Brent.Howell@fricknet.com</td></tr>
<tr><td>Phone #</td><td>+1 (847) 918-2211 Office
+1 (847) 975-8982 Cell</td></tr>
<tr><td>5.</td><td>Availability of solution in Brasil</td><td colspan="2">Yes</td></tr>
<tr><td>6.</td><td>Prior deployment in Brasil</td><td colspan="2">No</td></tr>
<tr><td>7.</td><td>Local representative in Brasil</td><td colspan="2">In-progress</td></tr>
<tr><td>8.</td><td>Local representative Name</td><td colspan="2">TBD</td></tr>
<tr><td>9.</td><td>Local representative Contact Information</td><td colspan="2">TBD</td></tr>
<tr><td>10.</td><td>Solution Description</td><td colspan="2">Container Movement Passive RFID Tracking</td></tr>
</table>

Table: Frick Solution Information

TransCore RFID Solution

TransCore's 75-year heritage supporting the transportation industry spans the early development of radio frequency identification (RFID) applications at Los Alamos National Lab to establishing North America's largest Web-based, logistics freight matching network. The breadth of TransCore's expertise includes systems integration, design consulting, operations, maintenance, manufacturing, RFID and satellite communications technologies, and extensive Web-based logistics and transportation management systems.

No.	Focus Area	Details
1.	Type of Solution	Cargo and Container Tracking
2.	Solution provider Name	TransCore Ltd (a unit of Roper Industries) (http://www.transcore.com/)
3.	Address	TransCore Tracking & Communications 8158 Adams Drive Hummelstown, PA 17036, USA
4.	Point of Contact	Name: Chris Melton Email: Christopher.Melton@TransCore.com Phone #: +1-703-577-3675
5.	Availability of solution in Brasil	Yes
6.	Prior deployment in Brasil	Yes
7.	Local representative in Brasil	In process
8.	Local representative Name	N/A
9.	Local representative Contact Information	N/A
10.	Solution Description	Container Movement Passive RFID Tracking

Table: TransCore Solution Information

Nexbis - Barcode Solution

Nexbis is a developer of applications for Governments, specializing in the areas of National Security, Identity Verification and Document Authentication. In addition to having worked with numerous Governments, Nexbis also provides IT expertise ranging from National Security Advisory Service to System Integration and Implementation by leveraging on its experience. Nexbis combines this with the professional delivery approach befitting of the fast-growing Asian IT marketplace.

No.	Focus Area	Details	
1.	Type of Solution	Cargo and Container Tracking	
2.	Solution provider Name	Nexbis Ltd. (http://www.nexbis.com/)	
3.	Address	Nexbis USA Inc. 16192 Coastal Highway, Lewes, Delaware, 19958, USA	
4.	Point of Contact	Name	Bryan Di Lella
		Email	bryan.dilella@ici-consulting.com
		Phone #	+1 (703) 915-1620
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	No	
7.	Local representative in Brasil	No	
8.	Local representative Name	N/A	
9.	Local representative Contact Information	N/A	
10.	Solution Description	The NexTrack Cargo Container Security and Authentication Solution (NexTrack), enables real-time shipping and customs information via a 2-D barcode technology that references a secured centralized database.	

Table: Nexbis Solution Information

Intermec - RFID Solution

For more than 40 years, Intermec have invented technologies and created comprehensive rugged mobile business solutions that help to manage, operate, and monetize complex businesses. Companies around the world rely on Intermec technologies and solutions to transform their inventory processes, drive competitive advantage, and meet complex asset management needs. Intermec is a trusted technology partner with diverse global business relationships with such companies as Coca-Cola and British Sky Broadcasting as well as government organizations such as the U.S. Army and Britain's Royal Mail.

The Intermec contact information can be found in the below table.

No.	Focus Area	Details	
1.	Type of Solution	Cargo and Container Tracking	
2.	Solution provider Name	Intermec , Ltd (http://www.intermec.com/)	
3.	Address	Intermec Worldwide Headquarters 6001 36th Avenue West Everett, WA, 98203-1264, USA	
4.	Point of Contact	Name	Jeffrey Drago
		Email	Jeffrey.drago@intermec.com
		Phone #	+55 11 3711-6793
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	Yes	
7.	Local representative in Brasil	Intermec South America Ltda. Rua Samuel Morse, 120 - 9° andar - Edifício Itaju Brooklin Novo – São Paulo – SP – Brasil	
8.	Local representative Name	Bianca Nascimento	
9.	Local representative Contact Information	+55 (11) 3711-6772	
10.	Solution Description	Intermec Passive RFID Tracking	

Table: Intermec Solution Information

Non- US sources of supply of Cargo Monitoring Mechanism solutions

Tenacent - RFID Solution

Established in 2002, Tenacent SA is a coordinator of innovative technology solutions based on information, communications and RFID technology. Tenacent SA serves global markets focused in niche low-cost UHF RFID and physical container security solutions. They thrive on exploring cutting edge technologies and forge true partnerships with industry to achieve solutions geared to curb recurring costs. Comprising of key associate consultants, Tenacent SA assists in the design and implementation of network-centric and off-line RFID supply chain security and visibility solutions. Their cost effective Inter-modal security RFID tamper indication solutions use the latest passive RFID engineering practices available today.

The Tenacent contact information can be found in the below table.

No.	Focus Area	Details	
1.	Type of Solution	Cargo and Container Tracking	
2.	Solution provider Name	Tenacent (http://www.tenacent.co.za/)	
3.	Address	South Africa Durban	
4.	Point of Contact	Name	Andy Brown
		Email	andyb@tenacent.co.za
		Phone #	+27 82 4118359
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	No	
7.	Local representative in Brasil	No	
8.	Local representative Name	N/A	
9.	Local representative Contact Information	N/A	
10.	Solution Description	Container Movement utilizing Passive RFID Tracking	

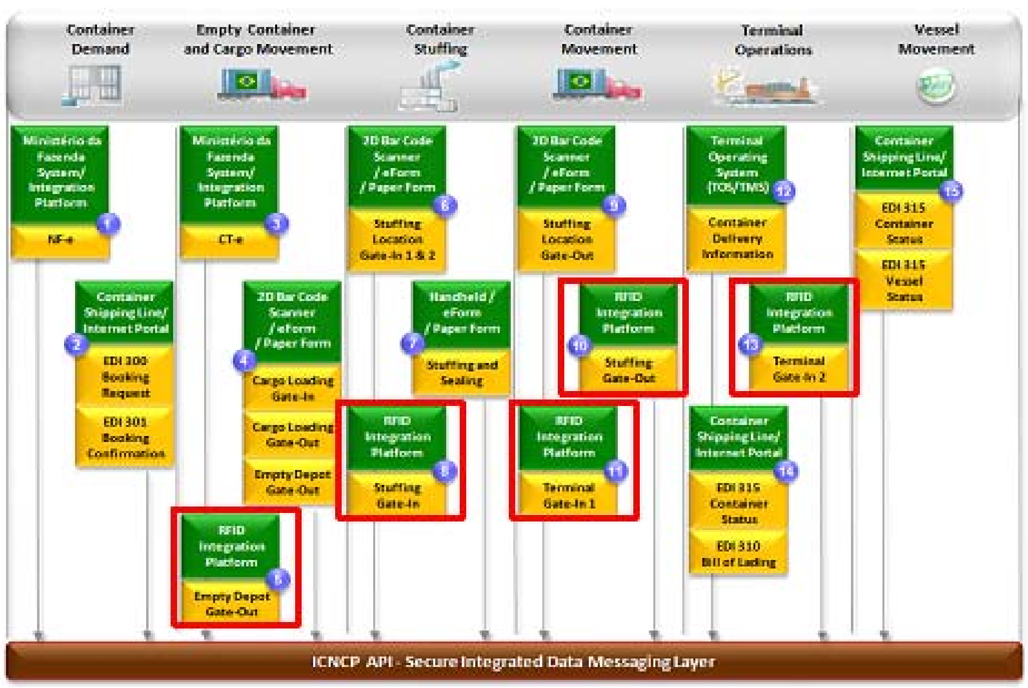
Table: Tenacent Solution Information

Summary

Across the entire export logistics chain, (Container Demand to Vessel Movement) RFID technology is utilized by the ICNCP project to drive efficiency and security. By using technology as an enabler, all the logistics chain stakeholders will be able to track and monitor export containers to gain:

- Better knowledge about the physical logistics chain and its status
- Better business efficiency, reliability, visibility, and consumer confidence

The image below shows the specific RFID based being generated in the Export Logistics Chain



Systems Integration and Information Exchange

Integration of maritime logistic systems is needed to process export containerized cargo more efficiently and securely from Brasil. Exchange of key logistics chain information to all the relevant stakeholders and government agencies is a goal for processing cargo in a secure manner via Sistema Porto Sem Papel. As part of the ICNCP project design, the Unisys Team has assimilated all the currently available logistics chain data from the Container Demand to Discharge/ Export Declaration from Brasil. This Systems Integration and Information Exchange is the third component of the ICNCP To-Be Solution design.

The ICNCP Application Programmable Interface (API) will allow the integration and assimilation of data from several disparate data sources and systems that exist today or are planned to be deployed in the short term (3-6 months). The goals of the Systems Integration and Information Exchange component is to enhance the data model of Sistema Porto Sem Papel, enabling a single and unique view of the entire export logistics chain process. All of the data collected and mapped within the ICNCP API will be transmitted via standardized XML messages via a secure protocol to the Sistema Porto Sem Papel.

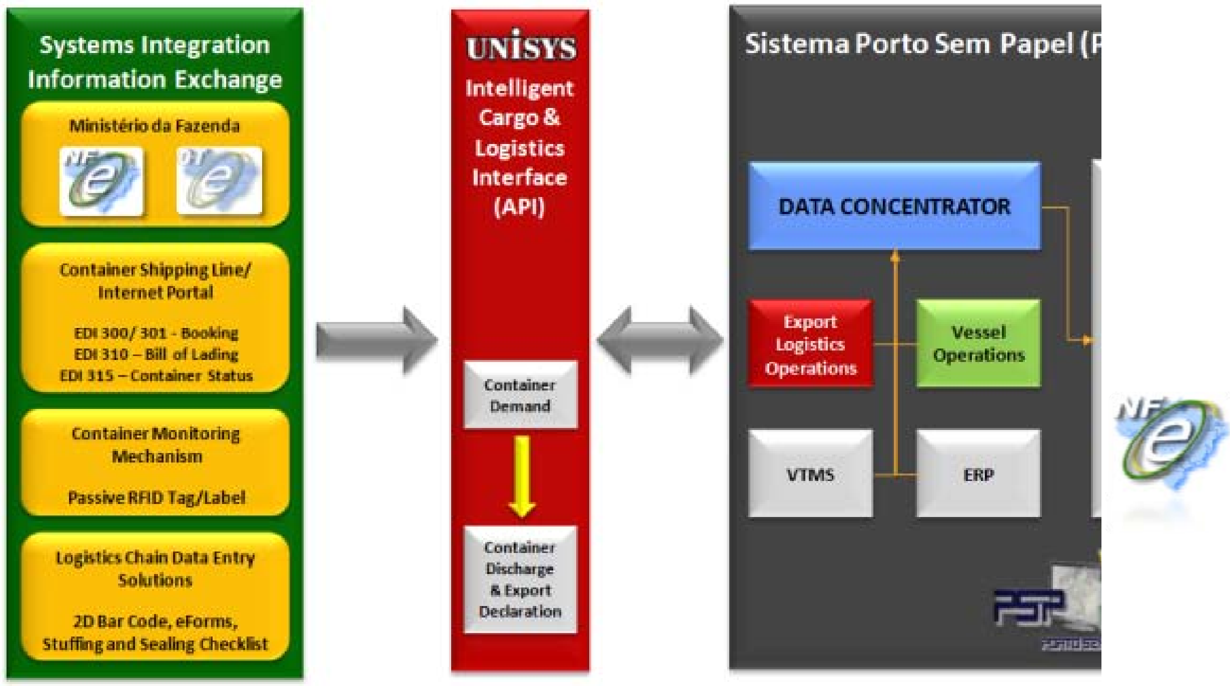


Figure: ICNCP Systems Integration & Master Data Set components

In developing ICNCP normalized data model (ICNCP Master Data Set), the Unisys Team researched and analyzed the different systems and technology solutions documented below utilizing the following design requirements:

- Solutions/ systems should support a deployment of the ICNCP To-Be Solution in a short timeframe
- Integration of disparate data sources should include currently available systems
- Usage of technology should be in alignment with port, state and federal laws
- There should be a balance between business processes and information exchange
- Technology should used as an enabler to collect and share information
- All data collected needs to build towards enhancing the existing PSP data model

Ministerio da Fazenda Cargo Informaiton

Nota Fiscal Eletrônica (NF-e)

The Nota Fiscal Eletrônica is a digital document that proves the sale of goods or provision of services between parties. It exists in the digital environment and, is issued and stored electronically in order to document for tax purposes. Legal validity is guaranteed by digital signature of the sender (guarantee of authorship and integrity) and the receipt by the Treasury.

Conhecimento de Transporte Eletrônico (CT-e)

The Conhecimento de Transporte Eletrônico is a digital document that is issued and stored electronically to document information related to the transportation of cargo carried by all modes (Road, Air, Rail, Waterway and Pipeline), for tax purposes. Legal validity is guaranteed by digital signature of the sender (guarantee of authorship and integrity) and the receipt by the Treasury.

US sources of supply of System Integration and Info Exchange solutions
No US based solutions were found by the Unisys Team to integrate the cargo information provided by the logistics chain providers to the Ministerio da Fazenda.

Non-US sources of supply of System Integration and Info Exchange solutions

NDDigital Solution for NF-e and CT-e
Since 2003 NDDigital S/A, has been offering completed solutions for the productive enhancement and costs control in the printing environment, becoming one of Latin America main software developers. NDDigital is recognized by innovation, quality, integration and support services. The basic goal of NDDigital is to make progress in the knowledgment advance enhancing people and organization efficiency. One of the business that NDDigital work with is the Electronic Documents that evolves all the emission, control, receiving, re-emission of products NF-e, services, CT-e, “Carta de Frete eletronica”, as well validation of registration, reduction of communications links, allowing printing at any printer where the main differential is the security. The NDDigital contact information can be found in the below table.

No.	Focus Area	Details	
1.	Type of Solution	NFe and CTe Software	
2.	Solution provider Name	NDDigital Technologies (http://www.nddigital.com.br)	
3.	Address	R. Dr Walmor Ribeiro, 431 Coral, 88523-060 Lages SC Brasil	
4.	Point of Contact	Name	Guilherme Assis
		Email	guilherme.assis@nddigital.com.br
		Phone #	+55 (49) 3251 8058
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	Yes	
7.	Local representative in Brasil	Yes	
8.	Solution Description	Software integration for NF-e and CT-e	

Table: NDDigital Solution Information

The NDDigital solution can be integrated with ICNCP API sending the NF-e/ CT-e in XML format. It can also work with an existent ERP. Show below is the steps that NDDigital solution would help in the logistic chain sending data to the ICNCP API.

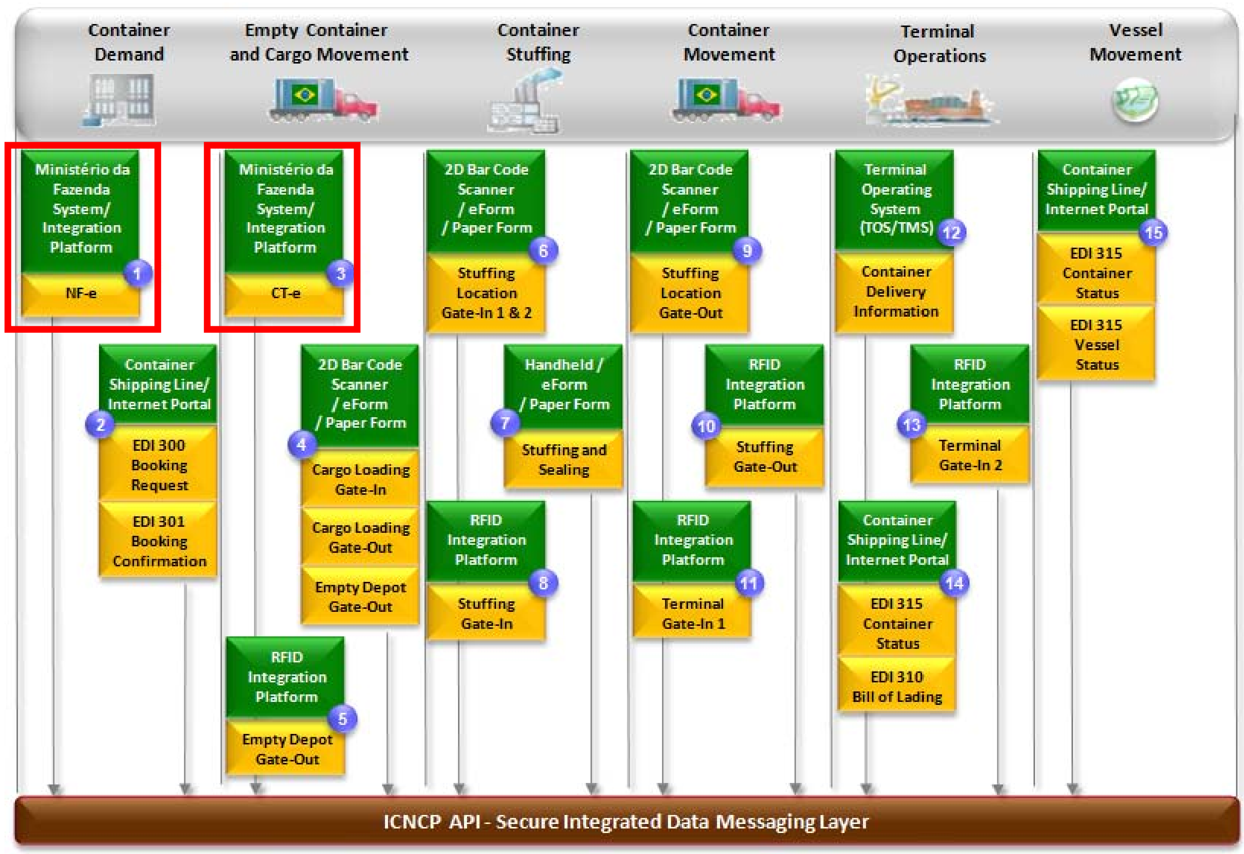


Figure: NDDigital exchanges with INCP API

Container Shipping Line/ Internet Portal Messages

Container Booking Request Message (EDI 300)

The Container Booking Request Message is generated by the Container Shipping Line or Internet portals to the Shipper/ Exporter or representative. It contains information of the order that is made by the Shipper/exporter to the container shipping line for reservation of space on a vessel for export of cargo from Brasil.

Container Booking Confirmation Message (EDI 301)

The Container Booking Confirmation Message is generated by the Container Shipping Line or Internet portals to the Shipper/ Exporter or representative. It contains information of the acknowledgement of the order made by the Shipper/exporter to the container shipping line and contains information of the space allocated on a vessel for export of cargo from Brasil.

Bill of Lading Message (EDI 310)
Bill of lading is a contract to carry the goods to the said destination based on which seller can claim consideration and buyer can take delivery of the goods. The Bill of Lading message is a message with information of the official document prepared by the carrier duly accepting the goods for shipment. It contains cargo information such as item, quantity, value, vessel details, date, port, consigner, consignee etc.

Container Status Message (EDI 315)
The Container Status message is a message with the notification of the change of status of an export container. It contains cargo information such as container number, quantity, vessel details, date, port, etc.

US sources of supply of System Integration and Info Exchange solutions

The GT Nexus Platform
GT Nexus is a company based around a simple but very powerful idea: put a single cloud-based collaboration platform at the center of a huge but enormously inefficient industry — global trade and logistics — and give companies a rapid, low-cost way to enable hundreds of inter-company supply chain processes on a global scale, across entire trading communities, to drive new levels of operational efficiency and business agility.

GT Nexus is a leading provider of global logistics and supply chain software, services and infrastructure. GT Nexus enables enterprises and third party logistics providers to optimize and manage the flow of goods and information through a single platform, from order point to final delivery, anywhere around the globe. The company serves global customers across industries with a comprehensive and integrated offering that spans and links three critical activity areas: multi-modal transportation management, global supply chain visibility, and performance management. GT Nexus technology also powers GTN – the world's leading portal for the ocean transportation industry. Backed by a consortium of global carriers based in Europe, Asia and the Americas, GTN provides a common transaction platform and seamless access to the global market for containerized shipping. The GTNexus contact information can be found in the table below .

No.	Focus Area	Details	
1.	Type of Solution	Integration Software	
2.	Solution provider Name	GT Nexus (http://www.gtnexus.com)	
3.	Address	**United States** 300 Lakeside Drive Suite 400 Oakland, CA 94612	
4.	Point of Contact	Name	
		Email	information@gtnexus.com

		Phone #	+1 510 808 2222 +1 510 808 2220
5.	Availability of solution in Brasil	Yes	
6.	Prior deployment in Brasil	No	
7.	Local representative in Brasil	No	
8.	Solution Description	Transaction of data (EDI 300/301/310/315, RFID) to the ICNCP API	

Table: GT Nexus Information

GT Nexus can send all the data from Booking Requests (EDI 300), Booking Confirmations (EDI 301), Container/Vessel Status (EDI 315), Bill of Lading (EDI 310) and RFID to ICNCP API in XML format. Below are the steps that GT Nexus can exchange data and documents.

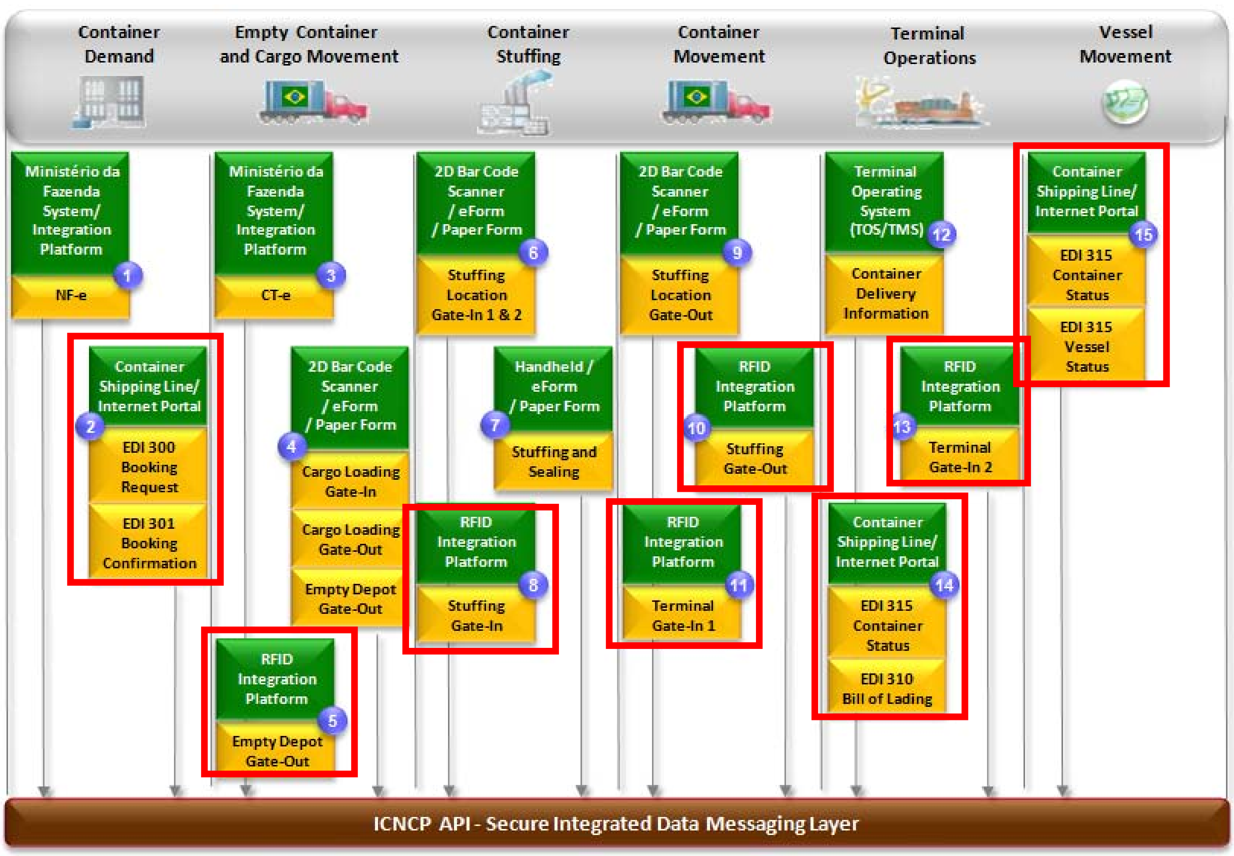


Figure: GT Nexus exchanges with INCP API

2.3.7 Cost Benefit Analysis

As per the scope of the Impact Analysis phase of the ICNCP project, the Unisys team initiated a Cost Benefit Analysis exercise. While the available project timeline does not permit a comprehensive, in-depth cost benefit analysis, a practical activity based analysis was performed to provide an indication of potential benefits resulting from implementation of the ICNCP project. Operating within these constraints, the Unisys Team executed the Cost Benefit Analysis on a representative logistics chain using an integrated approach at analyzing the costs and benefits of the ICNCP project to each individual logistics chain stakeholder as well as to each control point within the logistics chain.

Approach/ Methodology

As part of the integrated Cost Benefit Analysis approach, the Unisys Team applied two methodologies across the logistics chain to not only focus on the logistics chain stakeholder but also every export logistics chain control point within the scope of the ICNCP project. Shown below is the approach used by the Unisys Team to conduct the Cost Benefit Analysis in order to provide a comprehensive perspective of the logistics chain costs to SEP

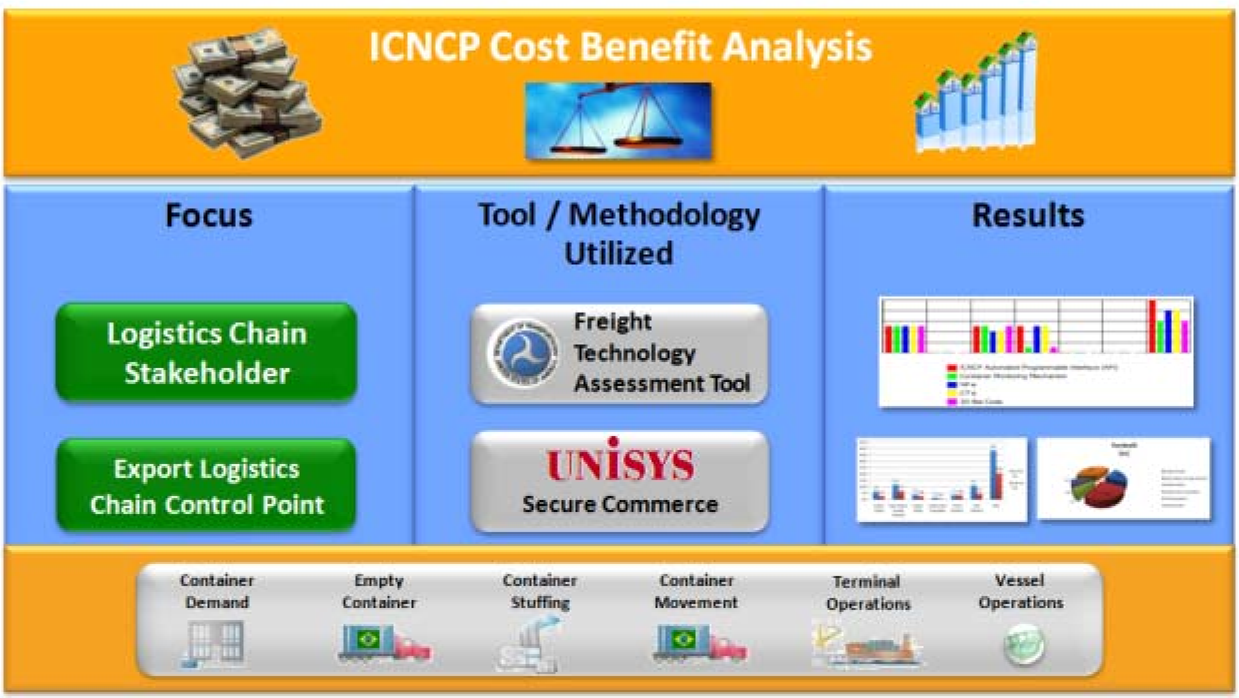


Figure: ICNCP Cost Benefit Analysis Approach

To conduct the Cost Benefit Analysis from the logistics chain stakeholder perspective, the Unisys Team met with the US Department of Transportation who provided the Freight Technology Assessment Tool (FTAT) which is optimized for evaluating the costs and benefits of various technology applications. The FTAT software is intended to enable transportation planners and decision makers in, public and private sectors to apply qualitative as well as quantitative analysis to their technology assessment and selection. It is a decision support system to assist logistics chain stakeholders in evaluating potential technologies and their effect on the performance of the end-to-end business process. The business process is evaluated before and after the technology is deployed in order to select the technology that will yield the best financial and non-financial performance. Most importantly, it utilizes activity based costing of supply chain processes to evaluate performance. The use of the FTAT tool formed one element in the analysis approach.

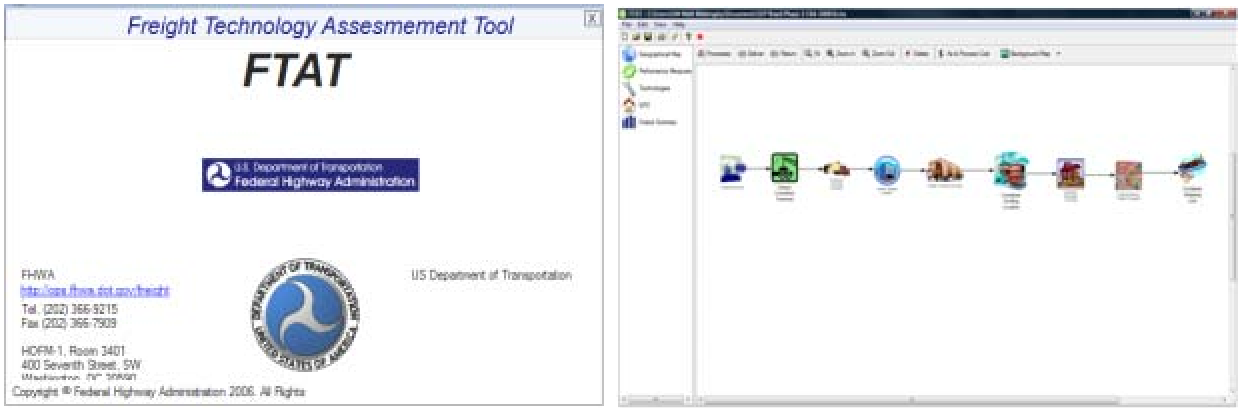


Figure: ICNCP Logistics Chain Stakeholder Analysis FTAT tool

Also, in order to create consistency with the previous phases of the ICNCP project, the Unisys Team listed out the logistics chain stakeholders who would be involved with the exercise and who would incur costs as well gain benefits from the implementation of the ICNCP project. Shown below is a table of the logistics chain stakeholders included in the Cost Benefit Analysis.

#	Entity	Abbr.	Logistics Chain Partners	Notes
1	Shipper/Exporter	SE	MC Mineração Curimbaba	Responsible for shipping instructions, NF-e, CT-e
2	Cargo Loading Location	CLL	MC Mineração Curimbaba - Poco do Caldas	Export Cargo Manufacturing and warehousing facility
3	Cargo Trucking Company	CATC	Alcace Transportes	Moves cargo from factory to stuffing location
4	Container Trucking Company	COTC	S.Magalhães Logistica em Comércio Exterior	Moves empty and full containers
5	Empty Container Terminal	ECT	www.saam.com.br saam	Container depot
6	Container Stuffing Location	CSTL	LIBRA TERMINAIS	

#	Entity	Abbr.	Logistics Chain Partners	Notes
7	Container Discharge Terminal	CDT	LIBRA TERMINAIS	Export container staging and loading location
8	Customs Broker / Freight Forwarder	CBFF	Indaiá logística internacional	
9	Container Shipping Line	CSHL	CSAV	Vessel Carrier and agent

Table: Export Logistics Chain Stakeholders

To conduct the Cost Benefit Analysis from the logistics chain control point perspective, the Unisys Team utilized the Secure Commerce Methodology which consisted of a comprehensive evaluation of the as-is and to-be logistics chain processes break downs. To accomplish this, the Unisys Team mapped the end-to-end cargo export process with focus on those processes that were labor-intensive, paper-based, and required a high degree of manual manipulation. The process mapping effort identified six (6) distinct control points to include:

- Container Demand
- Cargo and Empty Container Movement
- Container Stuffing
- Container Inland Transportation
- Terminal Operations
- Vessel Movement

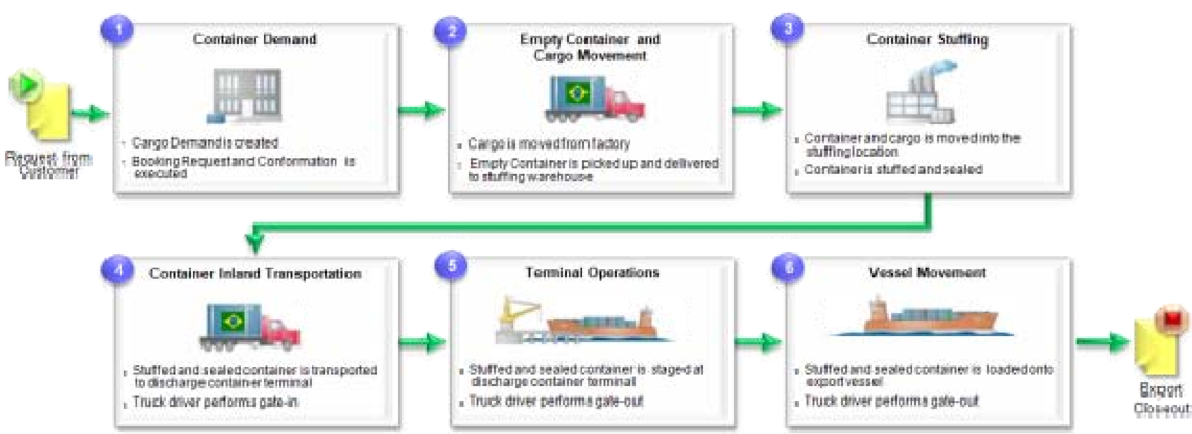


Figure: ICNCP Export Logistics Chain breakdown

Within each of these control points, individual business processes were documented as per the as-is and to-be analysis conducted in Phase 2 of the ICNCP project. Using this breakdown as the baseline, each task was assigned to an owner such as the shipper/exporter, container trucking company, cargo trucking company, the cargo loading operation, the container stuffing operation, the empty container terminal, the container discharge terminal, the container shipping line, and others. Shown below are screen shots of the logistics chain breakdown and the high level mapping.

Keeping in mind the complexities of the Brasilian Export logistics chain, logistics chain stakeholders were involved in multiple control points, which was addressed by using the integrated approach to show costs to multiple stakeholders across multiple control points. As an example, the empty container terminal was limited to the Cargo & Empty Container Movement control point, however the container shipping line was involved in every supply chain control point except the container stuffing and inland container movement control points.

#	Cost Driver - As - Is Process	SE	CLL	CATC	COTC	ECT	CSTL	CDT	CBFF	CSHL
1	Shipper/ Exporter receives shipping instruction from the Importer	X								
2	Shipper Exporter initiates Manual Nota Fiscal process: a. Manual generation	X								

Table: ICNCP Export Logistics Chain breakdown and Mapping

This information was then entered into the FTAT tool to produce a geographical map and a visual representation of the export logistics chain. Within each of these control points in the FTAT tool, individual business actions were assigned to an owner such as the shipper/exporter, container trucking company, cargo trucking company, the cargo loading operation, the container stuffing operation, the empty container terminal, the container discharge terminal, the container shipping line, and others. Shown below are screen shots of the logistics chain breakdown and the high level mapping within the FTAT tool that shows individual business processes within each control point for a given logistics chain stakeholder.

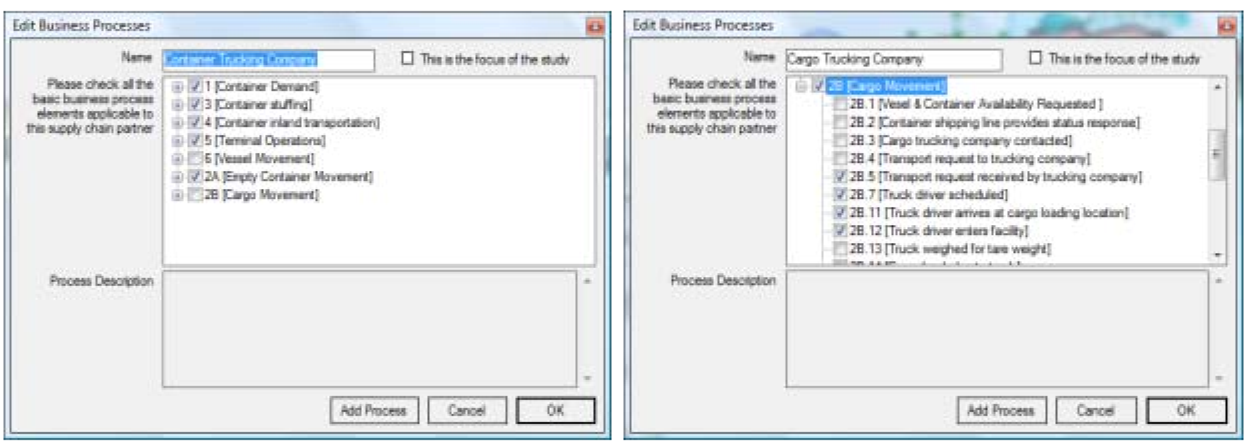


Figure: ICNCP Export Logistics Chain breakdown

To the two elements of the Cost Benefit Analysis, the FTAT tool and the Control Point mapping, the Unisys Team provided real world baseline data via an activity based mapping exercise and added a final component to complete the analysis structure. Comprehensive interviews with each logistics chain partners were conducted, to understand the role of each in the logistics chain, the activities they were responsible for and their interaction with other logistics chain partners. The logistics chain was broken down into individual tasks within each of the control points, the parameters of the control points were carefully set to establish a clear start and end for the actions in the control point and each task was analyzed on a step-by-step basis. After conducting the mapping exercise, where the Unisys Team assigned activates to each of the logistic chain stakeholders, the Unisys Team conducted such Cost Benefit Analysis interviews with the following relevant entities within each control point, to better understand the costs of doing business.

#	Entity	Logistics Chain Partner	Interview Date
1	Shipper/Exporter	MC Mineração Curimbaba	September 9, 2010
2	Cargo Loading Location	MC Mineração Curimbaba	September 10, 2010
3	Container Shipping Line	CSAV	September 14, 2010
4	Empty Container Terminal	saam	September 14, 2010
5	Cargo Trucking Company	ALCACE	September 16, 2010
6	Container Stuffing Location	LIBRA TERMINAIS	September 16, 2010
7	Container Discharge Terminal	LIBRA TERMINAIS	September 16, 2010
8	Customs Broker / Freight Forwarder	Indaiá logística internacional	September 17, 2010
9	Container Trucking Company	S.Magalhães	September 21, 2010

Table: ICNCP Cost Benefit Analysis Interview Schedule

The interviews with each supply chain partner identified all tasks within a given control point and how costs were determined for each of these tasks. To further validate the accuracy of the task definitions, the Unisys team performed on-site field visits to observe supply chain operations first-hand, photograph specific operations, and secure copies of documentation for later analysis. To provide a uniform basis for comparison, units of measure were agreed upon, typically on an hourly basis. Hourly wage rates were multiplied by the hourly time requirement to produce a total cost for each control point task. During the interviews, the logistics chain stakeholders shared with the Unisys Team, how much (approximate) time, each activity within the control point would take for them to complete. They also shared with the Unisys Team, the (approximate) hourly salary of the individual accomplishing the task.

Shown below is an example of the logistics chain breakdown and the rough order of magnitude activity based cost determination.

No.	Cost Driver - As - Is Process	Cost Determination	Units of Measure (hr)	Amount (Brasil R$)	Total Cost (Brasil R$)
1.	The stuffed and sealed container is handed off to the truck driver and he proceeds to gate-out along with a delivery and load form	Person - hourly rate	0.17	R$ 4.00	R$ 0.66
2.	Truck driver exits the container stuffing location	Person - hourly rate	0.03	R$ 4.00	R$ 0.13
3.	Truck driver transports the stuffed and sealed container to the container discharge terminal Truck driver arrives at the container discharge terminal	Person - hourly rate	0.05	R$ 4.00	R$ 0.20

Table: ICNCP ROM Activity Based Cost

After all the interviews were completed, the Unisys Team synthesized the results and conducted a final check to see if all the activities in the As-Is export logistics process had been addressed and assigned a time and hourly value, in order to compute the high level cost. During the interviews, the Unisys Team also presented the To-Be ICNCP solution components and design to the logistics chain stakeholders and acquired from them their feedback and insight the approximate increase in the efficiency of logistics tasks or reduction in time of each export logistics task by way of the following criteria:

- Was the task part of the To-Be ICNCP design?
- If yes, was the task needed to move the export cargo or share information or process documentation?
- Could the task be eliminated or streamlined by leveraging
- If the business process can be streamlined, if so by how much based on:
  - Industry best practices and insight
  - Logistics chain benchmarks
  - Lesson learned from previous projects

Also, to calculate high level costs, it was recognized by the Unisys Team that the cost values derived from the interview process were for a single export transaction. The annual export volume of the representative logistics chain averaged 3000 TEUs per year. To provide a uniform baseline for comparative purposes, the Unisys team established an assumption equating one export transaction to one TEU – multiplying each transaction value by 3000 produced an annual cost figure used in the analysis. These figures provided the basis for cost “drivers” for before and after comparison. Following completion of the “As-Is” mapping, a similar exercise was conducted for the “To-Be” solution. This data then forms the basis for the quantitative analysis of the FTAT tool. In order to conduct an analysis, you need performance measures by which you are able to evaluate the changes in the logistics chain as being a positive change and by how much. For the purposes of the ICNCP Cost Benefit Analysis, the Unisys Team selected the following performance measures:

No.	Performance Measure	Description
1.	Logistics Chain Efficiency	Streamlining of export logistics chain operations and reduction or elimination of redundancy within processes and operations
2.	Logistics Data Confidentiality	Security and integrity of logistics chain data, information, documentation and systems
3.	Logistics Data Visibility	Sharing of key logistics chain data to the stakeholders so that all entities are able to observe and be appraised of export logistics chain operations
4.	Logistics Cargo Security	Security and integrity of export cargo, personnel and other physical assets within the logistics chain
5.	Logistics Chain Operating Cost	Cost of executing the operations within an export logistics chain needed to sustain flexible operations

Table: ICNCP Logistics Chain Performance measures

The Unisys Team then created the Performance Measures within the FTAT tool and initiated that mapping process where each of the performance measures were mapped to individual activities within each control point and also an attribute for every performance measure was based on was selected. Each performance measure was further refined by assigning attributes to each technology being evaluated. Attributes were selected from a predefined list. The default position was that all attributes were weighted equally - selected attributes could be weighted to reflect their importance to the technology being evaluated. For example, if the user is seeking to select a technology that increases the relative weight of reliability, the weight of that attribute can be increased relative to all other selected attributes. Shown below are each of the performance measures and each of their attributes:

No.	Performance Measure	Attribute
1.	Logistics Chain Efficiency	Flexibility
2.	Logistics Data Confidentiality	Reliability
3.	Logistics Data Visibility	Responsiveness
4.	Logistics Cargo Security	Security
5.	Logistics Chain Operating Cost	Cost

Table: ICNCP Logistics Chain Performance measures

Shown below are screen shots of the FTAT tool, showing the Performance Measures, its individual attributes and a sample mapping of each of the performance measures with the export logistics chain activities.

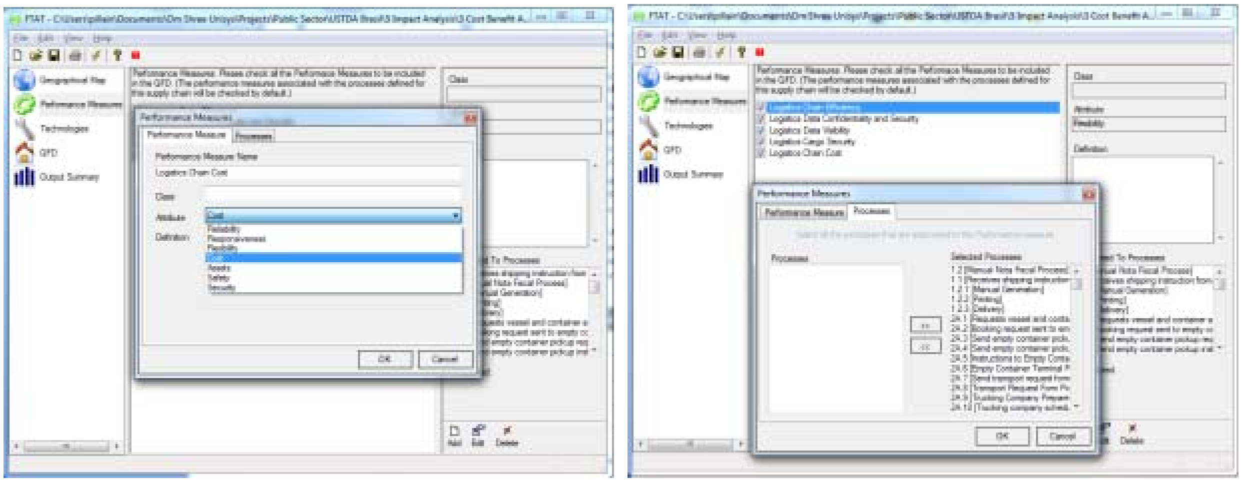


Figure: ICNCP Export Logistics Chain Performance Measures and Mapping

The purpose of the ICNCP project is to look at how technology solutions can not only increase the efficiencies of Brasilian export logistics operations, but also improve the security posture of said logistics chains by providing visibility and actionable information to the key decision makers and users of the "Porto Sem Papel" system. Taking this into account the Unisys Team included the following technologies that are part of the ICNCP "To-Be" design:

1. ICNCP Automated Programmable Interface
2. Container Monitoring Mechanisms
3. Nota-Fiscal Electronica (NF-e)
4. Conhecimento de Transporte Electronica (CT-e)
5. Two dimensional (2D) Bar Code system

The Unisys Team then went through an exercise of mapping each of the technologies with each of the individual control point activities within the FTAT tool and initiated that mapping process where each of the technologies components were mapped to individual activities within each control point. Shown below are screen shots of the FTAT tool, showing the technologies to be analyzed, and mapping of each of the technologies with the export logistics chain activities.

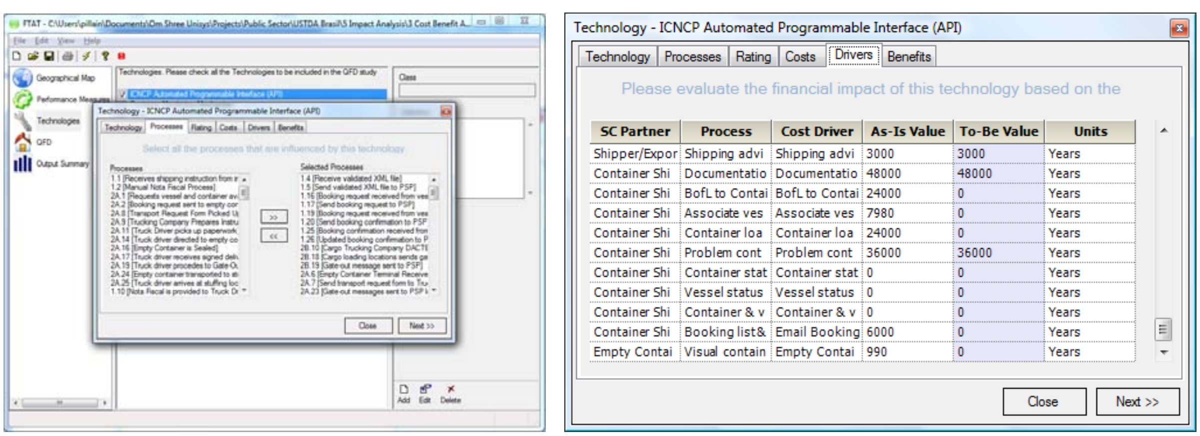


Figure: ICNCP Export Logistics Chain Technology Mapping

In addition to producing a quantitative analysis of the technologies proposed for the "To-Be" solution, the Unisys Team utilized the FTAT tool to produce a qualitative perspective as well. Conceptually, the qualitative component featured an evaluation of the technologies by an "expert panel." The Unisys Team formed a team of recognized experts in the field of cargo & port security and end-to-end logistics chain operations, to assess the capabilities and performance of ICNCP To-Be solution design technologies based on:

- Lessons learned from past project experience
- Knowledge of specific and similar technologies
- Performance in real world applications

The expert panel evaluated each technology against a list of performance measures and rated each using a rating ranging from -5 to +5 where a negative rating indicated that the technology downgraded the performance measure, a zero rating indicated that the technology did not affect the performance measure, and a positive rating indicated that the technology enhanced the performance measure. Shown below are screen shots of the FTAT tool, showing how the technologies were rated and evaluated

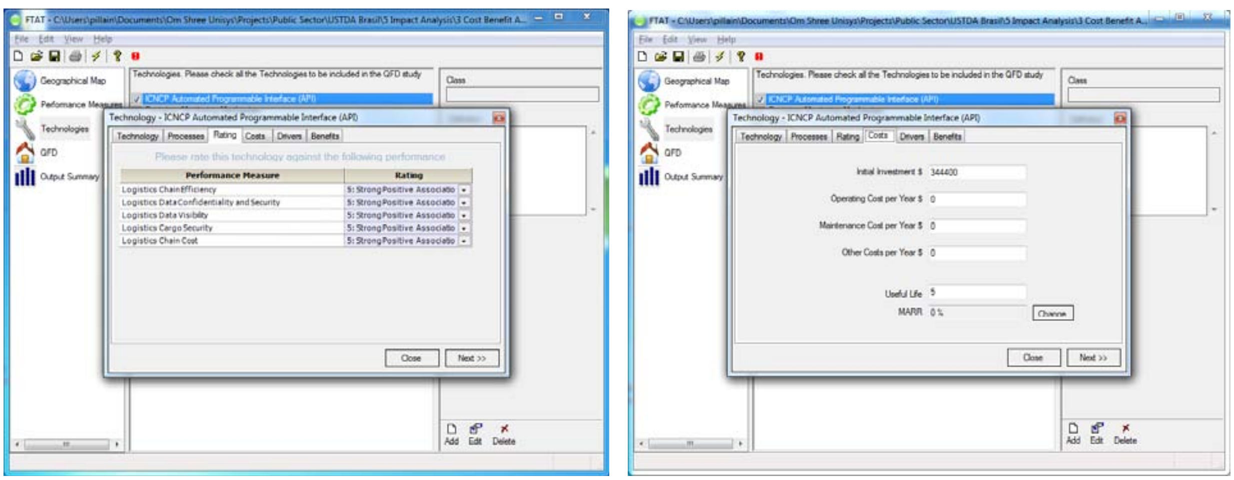


Figure: ICNCP Export Logistics Chain Technology Mapping

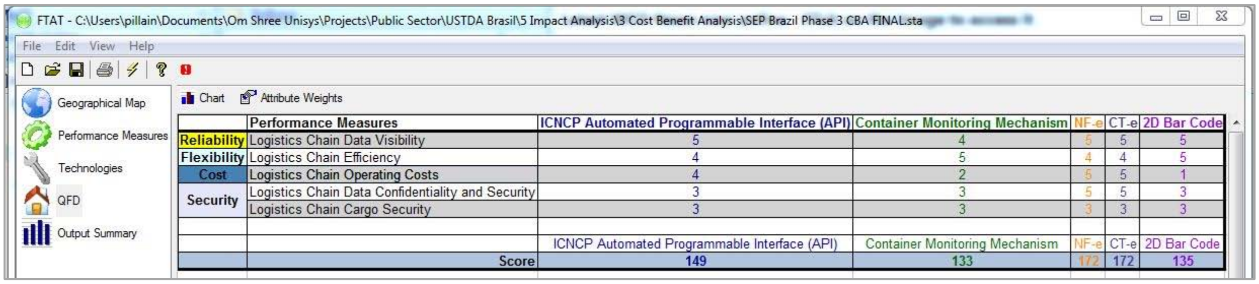
No.	ICNCP Technology Solution	Expert Panel Rating				
		LCE	LDC	LDV	LCS	LCOC
1.	ICNCP Automated Programmable Interface	4	3	5	3	4
2.	Container Monitoring Mechanisms	5	3	4	3	2
3.	Nota-Fiscal Electronica (NF-e)	4	5	5	3	5
4.	Conhecimento de Transporte Electronica (CT-e)	4	5	5	3	5
5.	Two dimensional (2D) Bar Code system	5	3	5	3	1

Figure: ICNCP Export Logistics Chain Technology Rating

Legend

No.	Performance Measure	Abbr.	No.	Performance Measure	Abbr.
1.	Logistics Chain Efficiency	LCE	4.	Logistics Cargo Security	LCS
2.	Logistics Data Confidentiality	LDC	5.	Logistics Chain Operating Cost	LCOC
3.	Logistics Data Visibility	LDV			

The FTAT tool then produced a total score for each technology as part of the ICNCP "To-Be" design. In this Qualitative Function Deployment (QFD) matrix, the total score was computed automatically for each technology, given that the expert panel had rated each of the ICNCP design technologies against the list of performance measures. Shown below is a screen shot of the FTAT tool, showing how the technologies were rated via the QFD matrix:



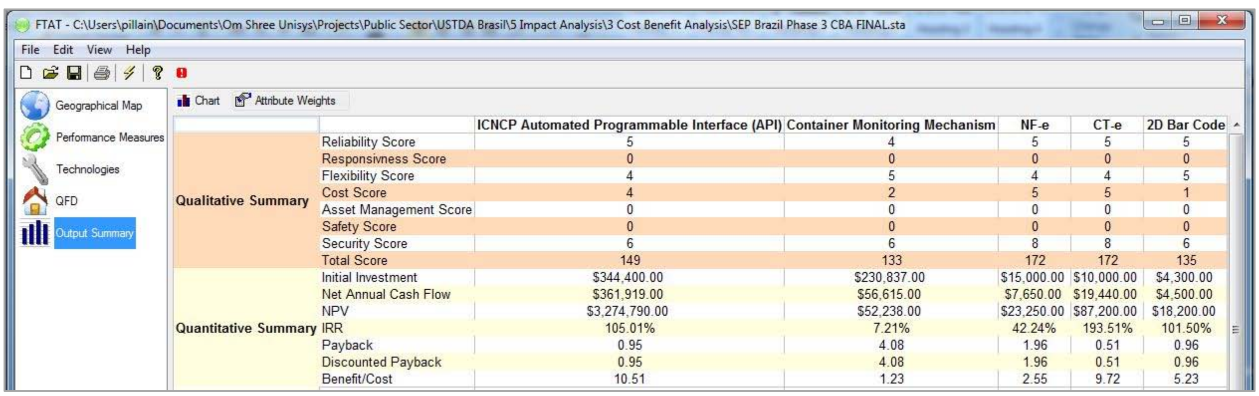
	Performance Measures	ICNCP Automated Programmable Interface (API)	Container Monitoring Mechanism	NF-e	CT-e	2D Bar Code
Reliability	Logistics Chain Data Visibility	5	4	5	5	5
Flexibility	Logistics Chain Efficiency	4	5	4	4	5
Cost	Logistics Chain Operating Costs	4	2	5	5	1
Security	Logistics Chain Data Confidentiality and Security	3	3	5	5	3
	Logistics Chain Cargo Security	3	3	3	3	3
		ICNCP Automated Programmable Interface (API)	Container Monitoring Mechanism	NF-e	CT-e	2D Bar Code
	Score	149	133	172	172	135

Figure: ICNCP Export Logistics Chain Technology QFD Matrix

The qualitative analysis or QFD presented the inputs of the "expert panel" evaluations in which the proposed technologies were assigned a score from -5 to +5 in the areas of Efficiency, Data Confidentiality and Security, Data Visibility, Cargo Security, and Operating Costs, and produced an output while taking into consideration the weighted attributes of reliability, flexibility, cost, and security.

In the final output of the evaluation, the FTAT tool produced a summary report of the qualitative and the quantitative analysis of each technology, including its performance score, initial investment, net annual cash flow, net present value, internal rate of return, payback period, discounted payback period, and cost-benefit ratio. These outputs are discussed in the following section.

Shown below is a screen shot of the FTAT tool, showing the overall output summary:



		ICNCP Automated Programmable Interface (API)	Container Monitoring Mechanism	NF-e	CT-e	2D Bar Code
Qualitative Summary	Reliability Score	5	4	5	5	5
	Responsivness Score	0	0	0	0	0
	Flexibility Score	4	5	4	4	5
	Cost Score	4	2	5	5	1
	Asset Management Score	0	0	0	0	0
	Safety Score	0	0	0	0	0
	Security Score	6	6	8	8	6
	Total Score	149	133	172	172	135
Quantitative Summary	Initial Investment	$344,400.00	$230,837.00	$15,000.00	$10,000.00	$4,300.00
	Net Annual Cash Flow	$361,919.00	$56,615.00	$7,650.00	$19,440.00	$4,500.00
	NPV	$3,274,790.00	$52,238.00	$23,250.00	$87,200.00	$18,200.00
	IRR	105.01%	7.21%	42.24%	193.51%	101.50%
	Payback	0.95	4.08	1.96	0.51	0.96
	Discounted Payback	0.95	4.08	1.96	0.51	0.96
	Benefit/Cost	10.51	1.23	2.55	9.72	5.23

Figure: ICNCP Export Logistics Chain Technology QFD Matrix

From a Control Point perspective, the Unisys Team utilized the Secure Commerce Methodology to analyze the export logistics chain at its basis and developed Rough Order of Magnitude (ROM) activity based costs were calculated on a side-by-side basis.

Shown below is an example of the logistics chain breakdown and the rough order of magnitude activity based cost determination.

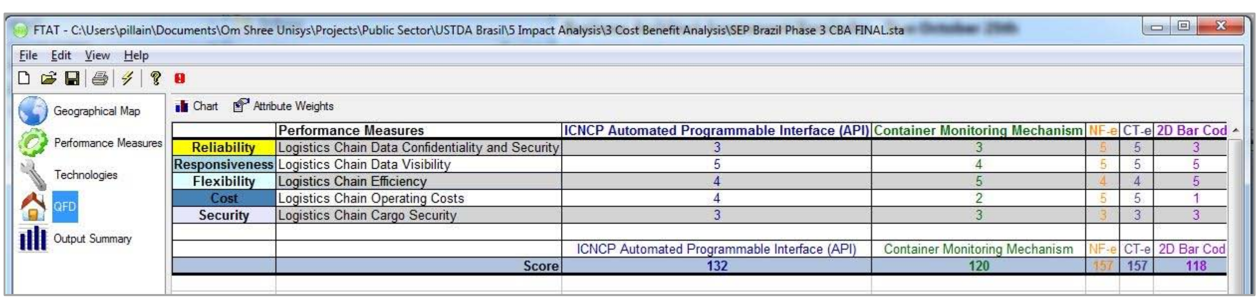
Cost Driver	As-Is Process				To-Be Process			
	Cost Det.	UOM (hr)	Amt. (R$)	Total Cost (R$)	Cost Det.	UOM (hr)	Amt. (R$)	Total Cost (R$)
Shipper/ exporter sends the following to the container trucking company to initiate the empty container pick-up process: - Booking confirmation information	Person - hourly rate	0.17	R$ 4.00	R$ 0.66	No cost electronic operation	0.00	R$ 0.00	R$ 0.00
Shipper/ exporter sends the following to the container trucking company to initiate the empty container pick-up process: - Shipping Instructions	Person - hourly rate	0.03	R$ 4.00	R$ 0.13	No cost electronic operation	0.00	R$ 0.00	R$ 0.00
Shipper/ exporter sends the following to the container trucking company to initiate the empty container pick-up process: - pro forma invoice	Person - hourly rate	0.05	R$ 4.00	R$ 0.20	No cost electronic operation	0.00	R$ 0.00	R$ 0.00

Table: ICNCP Control Point Rough Order Of Magnitude Cost Analysis

The results of the Cost Benefit Analysis are discussed in the following section.

Preliminary Findings

The Unisys Team utilized the FTAT tool to generate a qualitative and quantitative output within the limits of the static data availability. The qualitative analysis or QFD took into account the inputs of the "expert panel" evaluations and produced the following output:



	Performance Measures	ICNCP Automated Programmable Interface (API)	Container Monitoring Mechanism	NF-e	CT-e	2D Bar Cod
Reliability	Logistics Chain Data Confidentiality and Security	3	3	5	5	3
Responsiveness	Logistics Chain Data Visibility	5	4	5	5	5
Flexibility	Logistics Chain Efficiency	4	5	4	4	5
Cost	Logistics Chain Operating Costs	4	2	5	5	1
Security	Logistics Chain Cargo Security	3	3	3	3	3
		ICNCP Automated Programmable Interface (API)	Container Monitoring Mechanism	NF-e	CT-e	2D Bar Cod
	Score	132	120	157	157	118

Figure: ICNCP Export Logistics Chain Technology QFD Matrix

The first two columns listed the Performance Measures and Attributes against which each technology was evaluated and the last five columns display the ratings score assigned to each of the proposed technologies. The last row provided the output scores for each technology based on the above data inputs that included process mappings, costs, and process improvements. The relative scores are summarized below:

Technology	Reliability	Responsivness	Flexibility	Cost	Assets	Safety	Security	Total Score
ICNCP Automated Programmable Interface (API)	3	5	4	4	0	0	3	132
Container Monitoring Mechanism	3	4	5	2	0	0	3	120
NF-e	5	5	4	5	0	0	3	157
CT-e	5	5	4	5	0	0	3	157
2D Bar Code	3	5	5	1	0	0	3	118

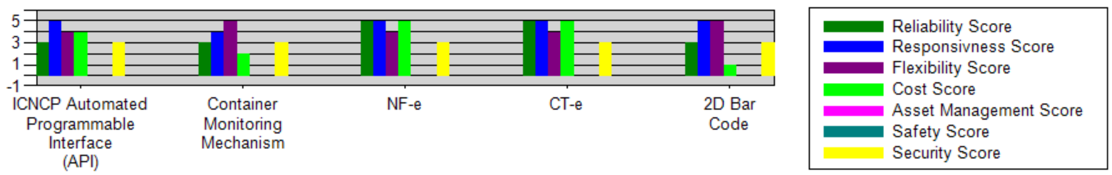


Figure: ICNCP Export Logistics Chain Technology QFD Analysis

These ratings provided a relative comparison between technologies for this specific logistics chain, not as a ranking of importance in trade applications across the import/export spectrum, however the results were useful in evaluating the importance of multiple technology applications for logistics chains and showed that while each technology contributes to the overall efficiency of the logistics chain in its own right, the combination of technologies as a system provides greater benefit.

Documented below are some of the results of the initial qualitative assessment conducted by the Unisys Team, based on the results articulated by the FTAT tool:

ICNCP Automated Programmable Interface (AP)

- It provides the overall mechanism to integrate the entire export logistics chain – the glue that holds all the parts together, but also a mechanism for sharing logistics chain data that is simpler, cheaper, and more efficient than traditional EDI.
- It makes it easier to customize the flow of information between logistics chain partners by provides a system where data is entered once but used many times, reducing or eliminating data transcription errors.
- It replaces paper trails with electronic information thereby making it more flexible
- Rather than each logistics chain partner having to collect and maintain large databases of shipment related information, the API enables partners to maintain only the data they create and then share that data with other partners through a common web interface
- It provides a tool to logistics chain partners to have access to detailed shipment data visibility without requiring them to replace or overhaul their existing information systems.

NF-e and CT-e

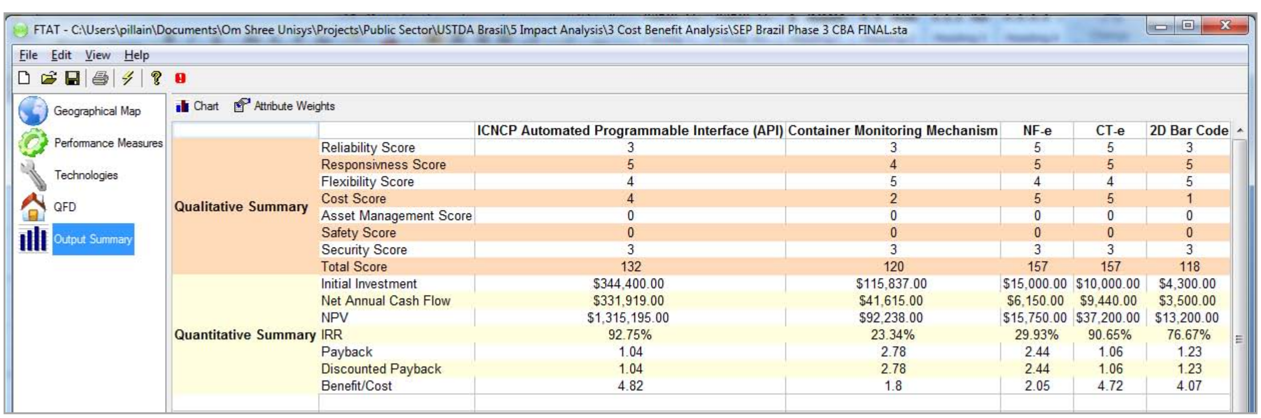
- NF-e and CT-e are key components that contribute greatly to the success of the electronic interface system to the Porto Sem Papel system
- NF-e will enhance the logistics chain master data set by providing information such as who is the vendor, who is the customer, what kind of goods or services are being acquired and, if available, who is the entity transporting the goods
- CT-e will enhance the logistics chain master data set by providing information about the cargo being transported such as the Transport Company, transport mode, transport carrier information, product value, taxes, quantity purchased, delivery forecast, etc.

Container Monitoring Mechanisms (including Bar Code technology)

- RFID and Bar Code technologies provide a major boost to logistics chain efficiency and security by automating the collection of data and management of assets that previously was done manually. These technologies offer benefits such as
  - Ease of installation and integration
  - Automation of Gate-in and Gate-out terminal operations
  - Ruggedized solution set with components being weatherproof
  - Utilization of open UHF frequencies currently in use in Brasil
  - Compatible format
  - Need for basic personnel training

As noted above, the FTAT tool also produced a quantitative assessment of the relative benefits of the ICNCP project design technologies. This function of the software operated on the data inputs provided by the Unisys Team when information on each individual logistics chain process activities were assigned to each technology. Both "As-Is" and "To-Be" cost values, derived from the activity-based cost mapping described earlier, were inputted for each applicable task; these entries formed the "cost drivers" for each process and its associated technology. Additional costs such as initial investment expenses, yearly operating costs, maintenance costs, other costs as well as useful life of each technology solution were inputted as well.

The final FTAT tool output summary report shown below produces two tables, one for the qualitative analysis and the other for the quantitative analysis as shown below.



		ICNCP Automated Programmable Interface (API)	Container Monitoring Mechanism	NF-e	CT-e	2D Bar Code
Qualitative Summary	Reliability Score	3	3	5	5	3
	Responsivness Score	5	4	5	5	5
	Flexibility Score	4	5	4	4	5
	Cost Score	4	2	5	5	1
	Asset Management Score	0	0	0	0	0
	Safety Score	0	0	0	0	0
	Security Score	3	3	3	3	3
	Total Score	132	120	157	157	118
Quantitative Summary	Initial Investment	$344,400.00	$115,837.00	$15,000.00	$10,000.00	$4,300.00
	Net Annual Cash Flow	$331,919.00	$41,615.00	$6,150.00	$9,440.00	$3,500.00
	NPV	$1,315,195.00	$92,238.00	$15,750.00	$37,200.00	$13,200.00
	IRR	92.75%	23.34%	29.93%	90.65%	76.67%
	Payback	1.04	2.78	2.44	1.06	1.23
	Discounted Payback	1.04	2.78	2.44	1.06	1.23
	Benefit/Cost	4.82	1.8	2.05	4.72	4.07

Figure: ICNCP Export Logistics Chain Technology Quantitative Analysis

Documented below are some of the results of the initial quantitative assessment conducted by the Unisys Team. The purpose of this section is to present the primary costs documented by the Unisys Team within the scope of the ICNCP project design deployment in a logistics chain with a similar structure as the representative export logistics chain.

Initial Investment Costs

Based on the Rough Order of Magnitude (ROM) costs developed for each technology component during Phase 2 of the ICNCP project, based on past project deployment experience, the Unisys Team broke down each of the costs to calculate the Initial Investment costs for each technology component. Shown below are the initial investment costs for the ICNCP design technology components.

No.	ICNCP Technology Solution	Initial Investment Costs (Brasil R$)
1.	ICNCP Automated Programmable Interface	R$344,400.00
2.	Container Monitoring Mechanisms	R$115,837.00
3.	Nota-Fiscal Electronica (NF-e)	R$15,000.00
4.	Conhecimento de Transporte Electronica (CT-e)	R$10,000.00
5.	Two dimensional (2D) Bar Code system	R$4,300.00

Table: ICNCP design technology component - Initial Investment Costs

Net Annual Cash Flow

The FTAT tool provides a net annual cash flow for each of the ICNCP design technology components. This represents the balance remaining after deducting cash outflow from cash inflow into the export logistics chain. In this Cost Benefit Analysis, the cash flow values are derived from the cost driver values provided by the individual logistics chain partners for each activity identified in the logistics chain mapping effort. Once the ICNCP project design is implemented, each of these activities is impacted by a specific technology that produces an anticipated cash flow. Shown below are the net annual cash flow numbers for the ICNCP design technology components.

No.	ICNCP Technology Solution	Net Annual Cash Flow (Brasil R$)
1.	ICNCP Automated Programmable Interface	R$331,919.00
2.	Container Monitoring Mechanisms	R$41,615.00
3.	Nota-Fiscal Electronica (NF-e)	R$6,150.00
4.	Conhecimento de Transporte Electronica (CT-e)	R$9,440.00
5.	Two dimensional (2D) Bar Code system	R$3,500.00

Table: ICNCP design technology component - Net Annual Cash Flow

Net Present Value (NPV)

The FTAT tool provides the Net Present Value (NPV) for each of the ICNCP design technology components. NPV figures are typically used in capital budgeting to assess the profitability of proposed investment or project. It is the difference between the sum of a project’s benefits over time and the sum of the cost over time. In the case of this ICNCP project, a uniform life cycle of 10 years or 5 years was established for comparison purposes. The FTAT tool not only assigns a monetary value to each benefit and cost but it also recognizes the time value of money – that is, R$1 today does not hold the same value as R$1 five years from now. As seen here, all five technologies display significant NPV values. Shown below are the NPV numbers for the ICNCP design technology components.

No.	ICNCP Technology Solution	Net Present Value (Brasil R$)
1.	ICNCP Automated Programmable Interface	R$1,315,195.00
2.	Container Monitoring Mechanisms	R$92,238.00
3.	Nota-Fiscal Electronica (NF-e)	R$15,750.00
4.	Conhecimento de Transporte Electronica (CT-e)	R$37,200.00
5.	Two dimensional (2D) Bar Code system	R$13,200.00

Table: ICNCP design technology component - Net Present Value

Internal Rate of Return (IRR)

The FTAT tool provides an Internal Rate of Return (IRR) assessment for each of the ICNCP design technology components. This is typically used by a business to measure the attractiveness of an investment decision or proposed new project. It is the rate of return that would make the present value of future cash flows plus the final market value of an investment equals the current market price of the investment. The minimum IRR is a value set by each business according to its own business practices but is included here for completeness. Shown below is the IRR for the ICNCP design technology components.

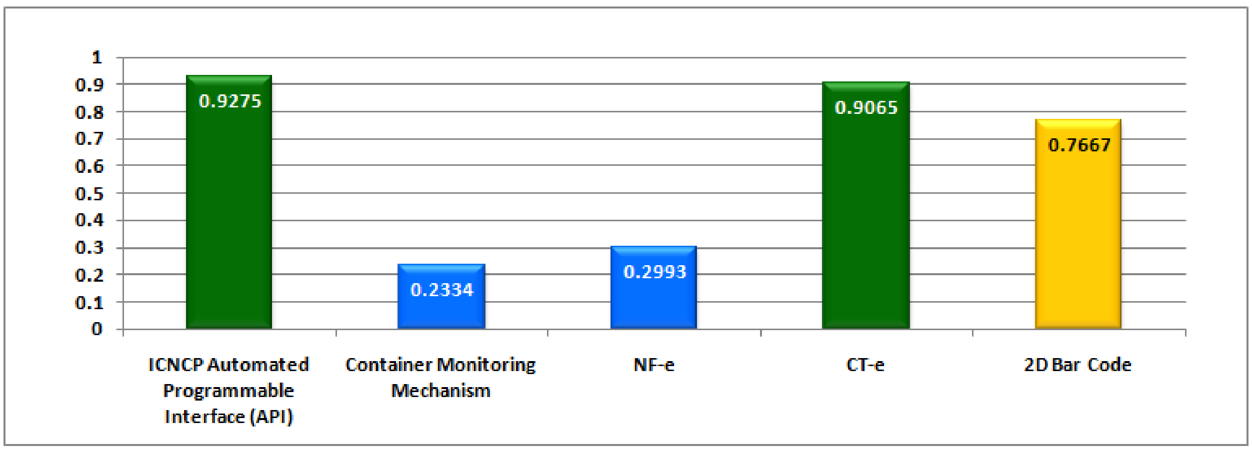


Figure: ICNCP design technology component - Internal Rate of Return

Based on the results presented by the FTAT tool, the Unisys Team is able to draw the following analysis:

- The technologies with the highest internal rate of return are:
    - ICNCP Automated Programmable Interface (API)
    - CT-e solution
    - 2-D Bar code solution

Process Improvement Costs

The FTAT tool provides an estimate of the process improvements (in Brasilian Reais) for each of the ICNCP design technology components. The values calculated by the tool are derived from the "As-Is" and "To-Be" cost drivers for each logistics chain activity. One thing of note is that the benefits values for technologies of the ICNCP project design are generally understated in this analysis as time and resources did not allow a more exhaustive investigation of potential savings such as reduced annual insurance costs resulting from enhanced efficiency and security, reduced pilferage costs per year resulting from improved data and cargo security, and reduced annual customs fees and penalties. Inclusion of these savings would obviously enhance the results. Shown below are the Process Improvement Costs estimates for the ICNCP design technology components.

No.	ICNCP Technology Solution	Process Improvement Costs (Brasil R$)
1.	ICNCP Automated Programmable Interface	R$361919.00
2.	Container Monitoring Mechanisms	R$ 56615.00
3.	Nota-Fiscal Electronica (NF-e)	R$7650.00
4.	Conhecimento de Transporte Electronica (CT-e)	R$19440.00
5.	Two dimensional (2D) Bar Code system	R$4500.00

Table: ICNCP design technology component - Initial investment costs

Cost Benefit Ratio (CBR)

The Unisys Team used the FTAT tool to calculate a Cost/Benefit Ratio for each of the ICNCP design technology components to better understand if the ICNCP project and its technology components are economically feasible. The ratio was calculated by dividing the quantified benefits by a measure of the cost. A result greater than one meant that the technology was feasible; less than one meant the technology was less than feasible. Shown below is the IRR for the ICNCP design technology components.

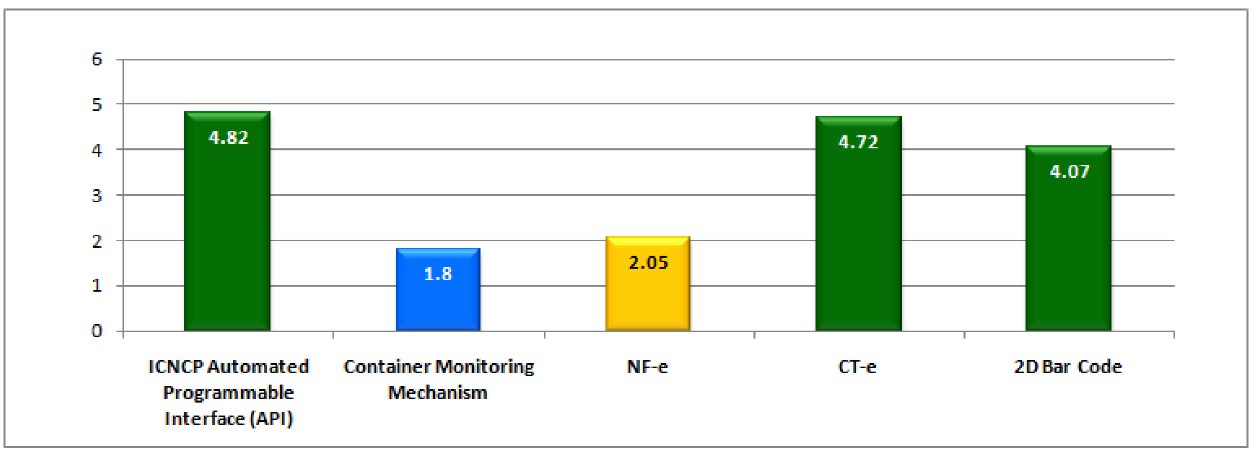


Table: ICNCP design technology component - Initial investment costs

Based on the results presented by the FTAT tool, the Unisys Team is able to draw the following analysis:

- The technologies with the highest cost benefit ratio are:
    - ICNCP Automated Programmable Interface (API)
    - CT-e solution
    - 2-D Bar code solution

In addition to the FTAT tool based quantitative and qualitative analysis on each of the technology components, the Unisys Team applied the Secure Commerce Methodology on a single representative export logistics chain to calculate the Rough Order of Magnitude costs for each control point. Using the activity based cost approach allowed the Unisys Team to generate a high-level overview of the "As-Is" and "To-Be" ICNCP solution. As noted above, the logistics chain was broken down into its individual, fundamental tasks, in a spreadsheet format. With each task assigned a time for completion and a cost factor based on the wage rate of the individual performing the task, the basis for data entry for the control point cost estimation was established. The Cost Benefit spreadsheet also allowed for certain high-level conclusions to be made.

Based on the approach explained in the previous section of this document, the Unisys Team was able to derive the following for the Control Point Cost Benefit Analysis.

Operating Time Analysis

In executing the activity based mapping approach, conducting interviews with key logistics chain stakeholders and by leveraging past project experience, the Unisys team was able to account for the total amount of time spent per control point for one export container shipment within the representative export logistics chain. Shown below is a breakdown of the amount of hours spent by multiple logistics chain stakeholders in each control point to process the shipment.

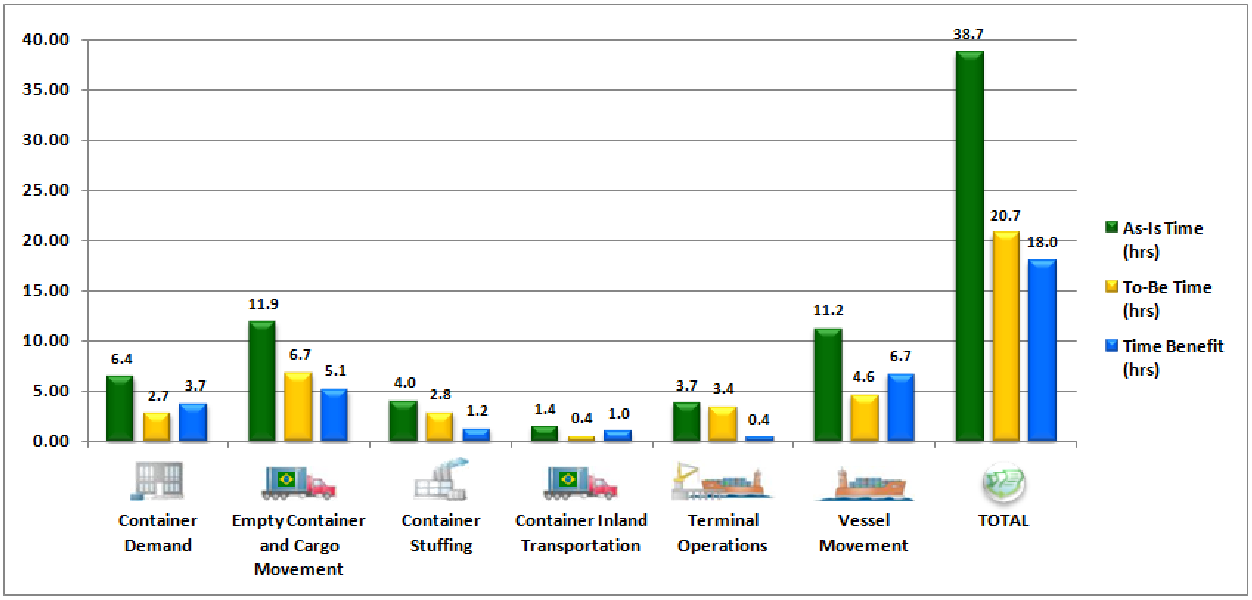


Figure: ICNCP Export Logistics Chain Control Point Time Breakdown

Based on the information collected during this exercise, the Unisys Team was able to do an overall comparison of the control points within the representative export logistics chain and is able to draw the following analysis:

- The control points with the largest amount of time spent currently (As-Is) to process the export container shipment are:
  - Empty Container and Cargo Movement – 11.9 hrs
  - Vessel Movement – 11.2 hrs

- The main reasons for the time needed at these control points is due to the redundancy within each sub-task, coordination between multiple entities for the same exact process and dependency on a paper based procedure
- The control points where the largest amount of time can be gained by deploying the ICNCP project design are:
    - Empty Container and Cargo Movement – 5.1 hrs
    - Vessel Movement – 6.7 hrs

- The control points where the largest amount of time benefit by percentage by deploying the ICNCP project design are:
    - Container Inland Transportation – 68%
    - Vessel Movement – 59%
    - Container Demand – 57%

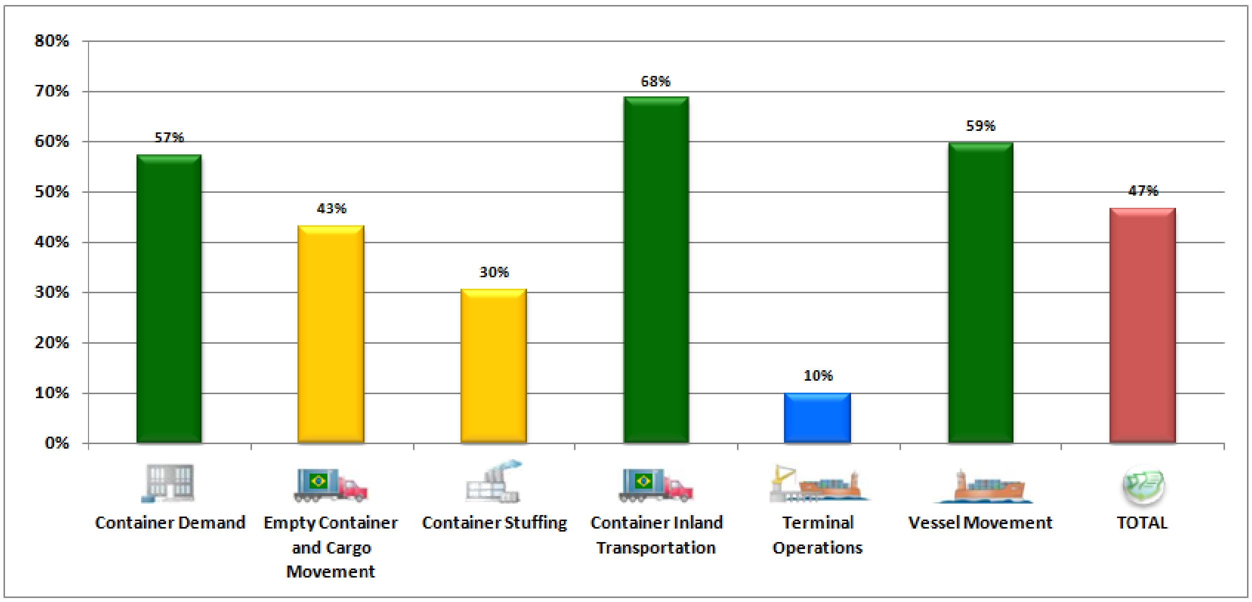


Figure: ICNCP Export Logistics Chain Control Point Percentage Breakdown

- Overall there is an anticipated 47% time gain as a result of process automation and standardization, information sharing across multiple entities and cargo and container information being available before the physical arrival of the cargo at each control point via the ICNCP project design.

Operating Costs Analysis

In executing the activity based mapping approach, conducting interviews with key logistics chain stakeholders and by leveraging past project experience, the Unisys team was also able to acquire information on the approximate salary or hourly rate of the personnel conducting the activities per control point for one export container shipment within the representative export logistics chain. Shown below is a breakdown of the approximate cost to multiple logistics chain stakeholders in each control point to process the shipment.

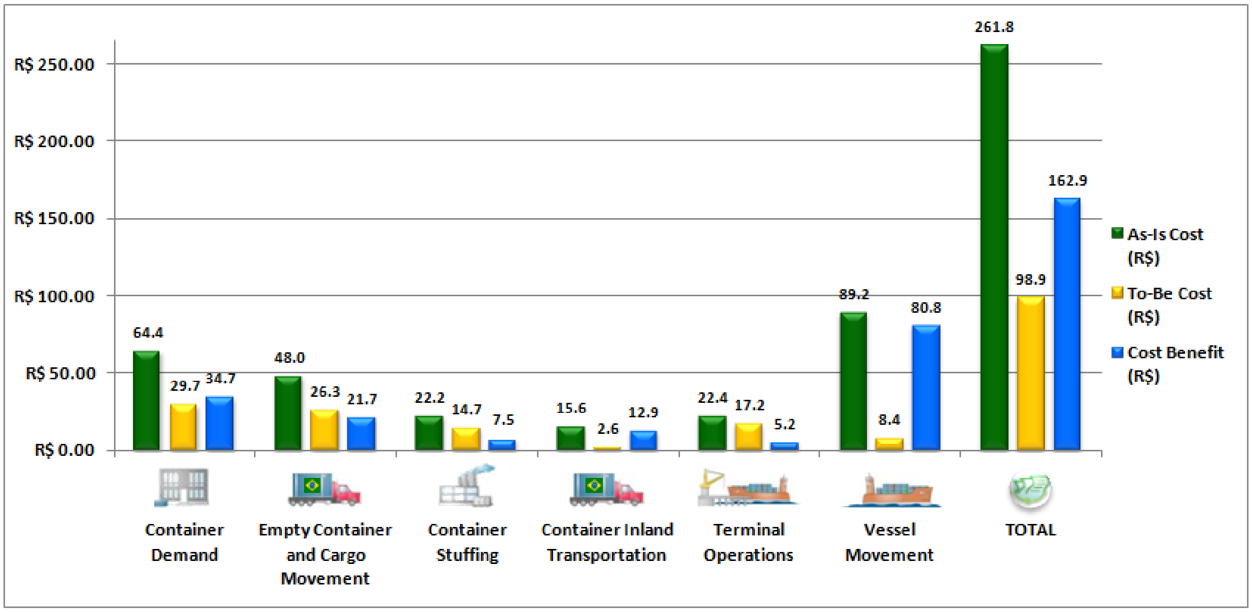


Figure: ICNCP Export Logistics Chain Control Point Cost Breakdown

Based on the information collected during this exercise, the Unisys Team was able to do an overall comparison of the control points within the representative export logistics chain and is able to draw the following analysis:

- The control points with the largest amount of cost currently (As-Is) to process the export container shipment are:
  - Vessel Movement – R$89.20
  - Container Demand – R$64.40

- The main reasons for the costs at these control points is due to the time spent coordinating between multiple entities for the same exact process and lack of standardized process and d training
- The control points where the largest amount of time can be gained by deploying the ICNCP project design are:
  - Vessel Movement – R$80.80
  - Container Demand – R$34.70

- The control points where the largest amount of cost benefit by percentage by deploying the ICNCP project design are:
  - Container Inland Transportation – 68%
  - Vessel Movement – 59%
  - Container Demand – 57%

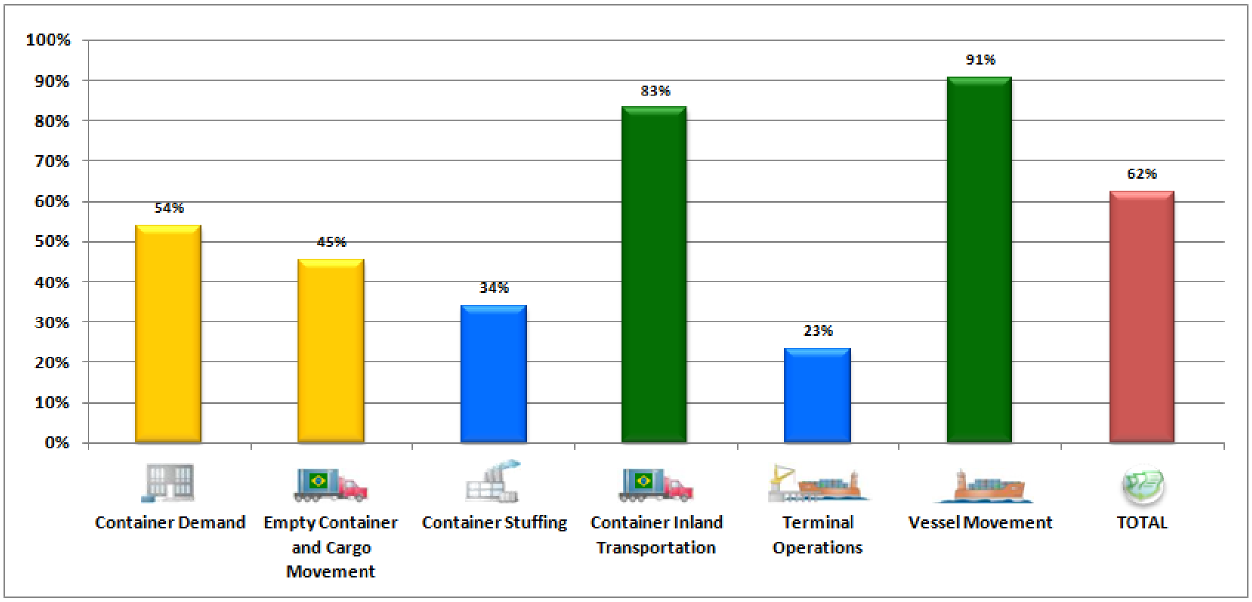


Figure: ICNCP Export Logistics Chain Control Point Percentage Breakdown

- Overall there is an anticipated 62% cost gain as a result of process automation and standardization, information sharing across multiple entities and cargo and container information being available before the physical arrival of the cargo at each control point via the ICNCP project design.

While it is recognized that this activity-based approach is a very high-level review, the cost and time savings estimates clearly point to significant benefits to be realized from adoption of the "To-Be" solution. Cost reductions make funds available for other priorities within the company. Time savings allow personnel resources to be reassigned or retrained from clerical duties to other more productive tasks within the company. The cost and time savings enable greater efficiency in logistics chain operations.

Overall Benefits

The purpose of this section is to provide the benefits that will be potentially experienced by implementing the ICNCP project design for a representative logistics chain and would be applicable for additional export logistics chains.

Process

During the analysis and design phases of the ICNCP project, the Unisys Team found multiple instances in which communication occurs between logistics chain partners was performed via telephone and fax. For instance, the original booking process required the shipper to phone the vessel carrier and relay booking request information that was data entered by the customer service representative. This data entry of information by the vessel carrier required the shipper to log in to the carrier's system and verify that the booking information entered was correct. When the ICNCP design will be deployed it will enable exporters to directly enter a booking (request) bypassing the telephone based data entry process and confirmation process demonstrating a time savings of one (1) hour per booking for both the carrier and the exporter.

Online booking will provide an additional benefit to the exporter in terms of booking confirmation and verification. During peak season exacerbated by both container shortages and strikes, exporters continually are required to follow up (with multiple phone calls) with the carrier to ensure that their bookings are confirmed and that they have space on the requested vessel. Web-enabling (automating) the booking request/confirmation process with ICNCP design solution will yield an approximate savings of two (2) to three (3) hours per day of personnel time within the exporter.

Economic

In the current environment, there are not container speed/velocity benefits that can be derived by securing containers using the low-tech / relatively low-cost security approach. (*US Customs & Border Protection currently utilizes other criteria to determine container inspection rates*) Therefore, the potential economic benefit can only be linked to the ability to ensure that the container is not diverted or lost in entirety. For the purposes of this logistics chain, the cost of the products in a single container is $25,000.00. In the event that a container was lost the impact to the logistics chain is the full $25,000.00. In the event that a portion of the container is lost the impact to the logistics chain is a percentage of the total dollar value plus the labor associated with unloading, inspecting and re-stuffing the container. During this time period an additional impact is that the container will not make its original sailing date for shipment to its destination. The following table summarizes the economic impact of theft described above:

Calculating Factor	Assumption	Cost
Average value of container content	$25,000	
Average number of containers (annually)	1,000	
Percentage of lost containers (annually)	0.05%	
Complete loss of single container	$25,000	
Annual loss of containers	Avg. of less than 1 Container	$25,000**
Percentage of partial loss of containers (annually)	0.1%	
Product loss of partial theft containers	5% of Container Contents	$1,250
Labor loss of partial theft containers	$80 / Container	$80
Goodwill loss of partial theft containers*	$200 / Container	$200
	Total	**$26,530**

Table: Economic Impact of Theft on 10,000 Containers

Using the above table and applying the same characteristics to 100,000 containers, the following economic impact would be seen:

Calculating Factor	Assumption	Cost
Average value of container content	$25,000	
Average number of containers (annually)	100,000	
Percentage of lost containers (annually)	0.05%	
Complete loss of single container	$25,000	
Annual loss of containers	50 Containers	$1,250,000

Calculating Factor	Assumption	Cost
Percentage of partial loss of containers (annually)	0.1%	
Product loss of partial theft containers	5% of Container Contents	$125,000
Labor loss of partial theft containers	$80 / Container	$8,000
Goodwill loss of partial theft containers*	$200 / Container	$20,000
	Total	**$1,403,000**

Table: Economic Impact of Theft on 100,000 Containers

* Note – Goodwill loss of the partial theft of a container is the loss associated with not meeting the sailing date and delivering the order to the customer at the agreed upon time.
**Note – Rounded up to one (1) container.

Using the figures above the dollar loss attributed to theft per container is between $14 and $26. Therefore, assuming that the solution would prevent theft by 80% the economic benefit of this solution would be between $11.22 and $21.22 per container. Theft and shrinkage associated with the importation of bauxite into the US, at current trading prices is negligible (*Syntex USA/ Mineração Curimbaba actuary could not provide theft statistics due to their insignificant impact*). Furthermore, occurrences of theft usually occur prior to the shipment's arrival at terminal operations and do not directly impact Syntex USA because of their IncoTerms, which are FOB. However, as prices rise, both the value of the merchandise and theft occurrences increase in tandem creating a multiplier effect.

Calculating Factor	Assumption	Cost
Average value of container content	$50,000	
Average number of containers (annually)	1,000	
Percentage of lost containers (annually)	0.1%	
Complete loss of single container	$50,000	
Annual loss of containers	Avg. of 1 Container	$50,000
Percentage of partial loss of containers (annually)	0.2%	
Product loss of partial theft containers	5% of Container Contents	$5,000
Labor loss of partial theft containers	$80 / Container	$160
Goodwill loss of partial theft containers*	$200 / Container	$400
	Total	**$55,560**

Table: Economic Impact of Theft on 10,000 Containers

Using the above table and applying the same characteristics to 100,000 containers, the following economic impact would be seen:

Calculating Factor	Assumption	Cost
Average value of container content	$50,000	
Average number of containers (annually)	100,000	
Percentage of lost containers (annually)	0.1%	
Complete loss of single container	$50,000	

Calculating Factor	Assumption	Cost
Annual loss of containers	100 Containers	$5,000,000
Percentage of partial loss of containers (annually)	0.2%	
Product loss of partial theft containers	5% of Container Contents	$500,000
Labor loss of partial theft containers	$80 / Container	$16,000
Goodwill loss of partial theft containers*	$200 / Container	$40,000
	Total	**$5,556,000**

Table: Economic Impact of Theft on 100,000 Containers

When bauxite prices rise, occurrences of theft also increase. Applying the same efficacy rate of 80%, the security solution could deliver $44.44 of value per container by reducing theft. Established players Syntex USA and Mineração Curimbaba currently operate in mostly a "Green-Lane" environment where most shipments are cleared long before they are pulled from port locations. For example, most of the shipments that were part of ICNCP project were either cleared at sea, or shortly after their arrival in the terminal in the United States.

Another potential area for logistics chain improvement lies in the amount of inventory and the associated carrying costs that Syntex USA incurs by maintaining approximately three months of inventory on hand in the United States, which ultimately impacts Mineração Curimbaba, the Brasilian exporter.

Calculating Factor	Assumption	Cost
On Hand Inventory level at Current Commodity prices	$30,000,000	
Inventory Carrying Cost Percentage	7%	
Annual Inventory Carrying Cost		$2,100,000
Safety Stock Levels	10%	$3,000,000
Annual Safety Stock Inventory Carrying Cost		$210,000

Table: Economic Impact of Inventory Costs

Effective supply chain visibility solutions have proven to reduce lead time variability and enable safety stock reductions upwards of 50%. In Mineração Curimbaba's export logistics chain, this could reduce inventory levels by as much as $1,500,000 and annual inventory carrying expenses by over $100,000. However, Syntex USA's relatively high inventory levels were driven by other factors that currently supersede the benefits attributable to reduced inventory and carrying cost levels. Furthermore, when considering products such as bauxite that do not spoil, there is limited flexibility with respect to inventory improvement initiatives.

Security

The last benefit yielded by the ICNCP project design is risk reduction associated with theft or terrorism. These benefits will be derived by monitoring the movement and the verification of container integrity. As demonstrated in the Phase 2 – ICNCP design document, the enhancement of additional processes in managing risk in conjunction with the use of seals, RFID tags and alert mechanisms will reduce the risks associated with export logisitcs chains.

The processes and technology put in place, when deployed via the ICNCP project will verify that during the stuffing operation there are no unwanted products inside the container or inside the container contents. Once the container is sealed the devices placed on the exterior of the container and the checkpoints where these devices are examined will show that the integrity of the container has not been compromised. The consolidation of this data via the ICNCP API and Porto Sem Papel system will provide the visibility to the container movement from one point to another showing where errors or risks are at when they occur (if they occur).

Going Forward

With the guidance provided by SEP and within the limitations of the time available to execute Phase 3 of the ICNCP project, the Unisys Team suggests a detailed Cost Benefit Analysis to be performed as a next step of the project. Documented below is a high level approach the Unisys Team suggest in order to accomplish this.

Going forward, the detailed Cost Benefit Analysis needs to present the primary costs required to deploy and implement the ICNCP design in its entirety in a steady state operational mode. In order to do this, two sets of costs need to be presented for operational steady state; the first set of costs is based on outfitting 1,000 containers with security components, while the second set is based on 100,000 containers. Cost differentials need to be presented in this manner to highlight the magnitude difference for a single organization implementation of the processes and technologies deployed in this solution and a mid-sized industry level impact. These costs need to be organized into two categories

- Implementation and deployment costs
- Container costs

Two subcategories should further differentiate whether these costs are one-time or recurring.

Implementation & Deployment Costs

The first category of costs is the implementation and deployment costs. These are costs that cover the time spent analyzing the export logistics chain and defining the appropriate processes and supporting technologies to be used. The cost of configuring and deploying the solution are also included in these costs.

These categories are the one-time costs for an entire company (logistics chain stakeholder) and are attributed to a company as a whole. Implementation service costs vary widely depending on scope, approach and assumptions as well as the organization size and number of locations (this estimate could significantly change between organizations that ship 1,000 vs. 100,000 containers). The hardware and software utilized in the engagement could scale from 1,000 containers to 100,000 containers with only marginal potential increases in the infrastructure cost (less than 10%). The control point costs are dependent upon the number of locations that comprise a logistics chain. Therefore, significantly expanding the number of locations would greatly increase the control point costs. Overall the implementation and deployment costs need to include:

- Implementation Services

- Hardware:
- Software:
- Control Point Costs

In addition to the one-time costs, recurring costs need to be accounted for. These costs are maintenance costs and typically include:

- Software Licenses
- Hardware Maintenance
- Monitoring and Coordination Resources

Container Costs

The second category of costs is the container costs. These include the cost of the devices used on a per container basis where applicable. Using the solution components that were included as part of the ICNCP design, the following cost components may be used when deploying the technology for additional logistics chains:

- Container Monitoring Mechanisms
- Gate – Check –In & Check-Out technologies
- Seals

Overall,

- The capital cost to implement the ICNCP project design for a typical logistics chain needs to be calculated
- The costs would need to be amortized over three to five years across a company's global operations and all containers
- Annual maintenance and support costs for support of the systems needs to be documented
- The cost to outfit each container with the full array of devices, inspection services and new technology components needs to be documented

In conclusion, significant investments are required to deploy secure commerce solutions which must be borne by various entities, both commercial and public sector. The ICNCP project design is commercially focused and does not rely upon investments in Port Terminal infrastructure. While, these investment amounts are not included in the ICNCP project cost summary, as they were not a part of the scope, they are a major cost driver which must be considered. For the security solution components that will be deployed in the ICNCP project, the following entities should or may bear the costs:

No.	Investment / Cost Category	Supply Chain Partner
1.	Implementation Services	Shipper/ Exporter/ Lead Government Agency
2.	Additional Personnel Salary	Shipper/ Exporter/ Logistics Provider
3.	Hardware (Servers)	Shipper/ Exporter/ Lead Government Agency
4.	Recurring Hardware Maintenance	Shipper/ Exporter/ Lead Government Agency
5.	Software	Shipper/ Exporter/ Lead Government Agency
6.	Recurring Software Maintenance	Shipper/ Exporter/ Lead Government Agency
7.	Control Point Implementation	• Shipper/ Exporter

No.	Investment / Cost Category	Supply Chain Partner
		• Terminal Operator(s) • Warehouse Operator • Logistics Provider
8.	Container Costs • Bolt seals • RFID Tag • Readers	• • Terminal Operator(s) • Carrier • Shipper/ Exporter

2.4 Phase 4 - Development of an Implementation Strategy

With guidance from SEP, the Unisys Team focused on the Export Logistics Chain with a goal of developing a high level Implementation Strategy for the ICNCP To-Be design. As part of Phase 4 of the ICNCP project, the Unisys Team drafted, compiled, and is submitting a deliverable report that encompasses:

- **Implementation strategy** for SEP to deploy the intelligent cargo project
- **Stakeholder Workshop** summary and feedback

An Implementation Plan and Strategy for the ICNCP project will develop actionable strategies for the execution of the Field Test. Incorporating all the components of the ICNCP To-Be Design simultaneously might not be the most efficient or effective process, so it is important to develop a clear action plan and timeline for Field Test implementation. The design recommendations can be long or short-term and may require localized changes as well as large-scale global changes across the entire export logistics chain, they may target processes involving only internal stakeholders or they may also involve external logistics chain partners. In this case an implementation plan can help detail the sequence of design recommendations, the resources required, the anticipated impact on export logistic chain stakeholders and any processes to follow in implementing them.

SEP chose the Unisys Team to initiate the ICNCP project because it wanted to identify key areas for logistics chain improvements that would help increase efficiency and effectiveness, and help SEP, the private sector and the Brasilian ports better meet their goals and objectives. The ICNCP project is clearly a significant investment of resources and time, and the Implementation Plan will help ensure that the Unisys Team To-Be design findings are translated into real logistics chain improvements. It is therefore essential that the Implementation Plan be prioritized as one of the most important steps of the project, and that it is carefully developed and executed.

In developing the Implementation Plan for the ICNCP project, the Unisys Team took into consideration the following strategic issues that impact the successful execution of the ICNCP Field Test:

- **Implementation timeline:** The timeline for an implementation plan can either be a few months or extend into a year or more depending on the kind of changes required and the resources available. Considering the requirements set forth by SEP to improve export logistics chain performance will include changes to existing processes that can be made in as little as six months, while other to-be design recommendations might require establishing new processes and realignment of functions or strategies that could take up to a year or more to implement.

- **Logistics chain stakeholder impact:** Some to-be design recommendations may impact certain logistics chain stakeholders more than others. For example, changing how cargo information is collected might have less impact on stakeholders than changing where the the cargo information is collected. In the latter case, there are additional costs (in creating new facilities and logistics infrastructures) which require new fundraising, and this would also impact stakeholders like local and global transporters. Since buy-in from key logistics chain stakeholders is so important in ensuring that recommendations are implemented, it is necessary to map the impact of each recommendation on the map of export logistics chain stakeholders.
- **Available Resources** - Implementing To-be design recommendations to improve logistics chain operations requires stakeholders to contribute time, money and personnel. It is also important to understand stakeholders' resource constraints when developing a timeline for implementation. As discussed in the earlier reports, financial resources may only be available on a certain timeframe, while other resources like personnel might be available on a rolling schedule. A viable implementation plan should take into account all such resource constraints and timing.
- **Changes (short, medium and long- term)**: Not all To-Be design recommendations can provide the same "bang for the buck." The process of prioritizing recommendations to develop an implementation plan also involves assessing the potential logistics chain improvements afforded by each recommendation. Complementing the impact of stakeholder involvement and available resources on the timeline for implementation, each recommendation's relative importance should also be considered. Earlier research with stakeholder feedback and quantitative data can help identify key bottlenecks in the logistics chain. These should become priority recommendations, while ongoing activities like relationships with other stakeholders in the logistics chain might be a longer-term goal for the implementation plan

As per the TOR requirements, the Unisys Team developed the ICNCP Implementation plan considering the following:

- Implementation tasks and schedule
- Documentation and project status requirements
- Resource and stakeholder requirements
- Funding requirements and sources
- Contractual and labor requirements
- Potential risks and issues

In documenting the Field Test Implementation Plan, the Unisys Team has established a straight-forward, structured process that efficiently and effectively drives the successful completion of this strategic project and comprises of the following phases:

Figure – ICNCP Field Test Phase Overview

The approach shown below has been created by the Unisys Team to execute the ICNCP Field Test for a single port to realize benefits such as:

- Improved export logistics chain operations;
- Safe and secure logistics chain operations;
- Reduction of port congestion;
- Improvements in cargo and port scheduling;
- Meet and/ or exceed International Maritime standards compliance.

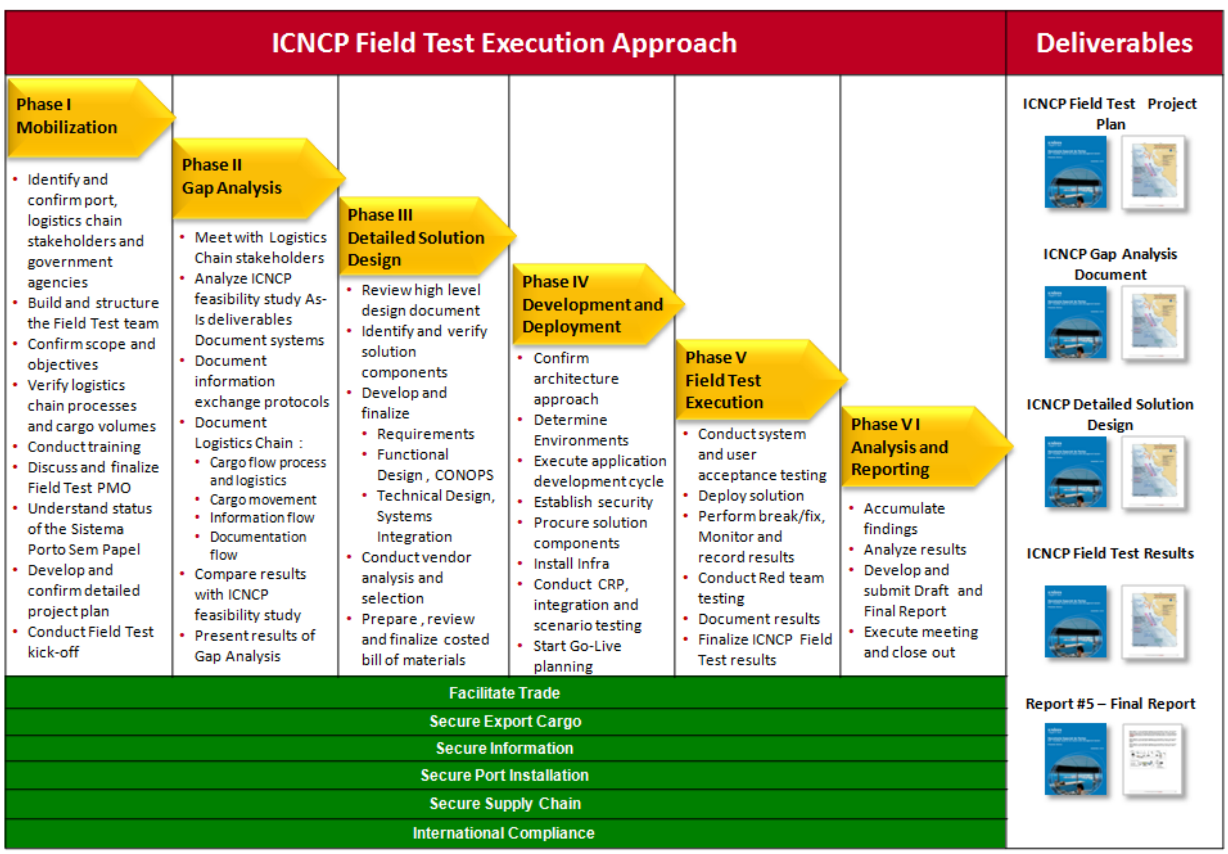


Figure – ICNCP Field Test Execution Approach Overview

The following section describes the activities and expected results of the ICNCP Field Test project.

- Implementation tasks and schedule
- Documentation and project status requirements
- Resource and stakeholder requirements
- Funding requirements and sources
- Contractual and labor requirements
- Potential risks and issues

2.4.1 Implementation Tasks and Schedule

In analyzing the requirements set forth by the ICNCP To-Be design, SEP requires a logically constructed Field Test Implementation Plan to assess the capability, performance and trade impact of an Intelligent Cargo solution. To achieve this objective and the others stated earlier in this document, the Unisys Team has outlined the major activities that are needed to be performed to successfully execute the Field Test. In the execution of this Field Test project, the selected execution team must collaborate and work closely with SEP in the development, integration, deployment, execution, and monitoring of the engagement.

Phase I – Mobilization

During the initial project mobilization, the Field Test team will establish documentation and deliverable standards that will be adhered to during the delivery of each task. This focus on standardization will ensure consistency across all deliverables and tasks of the project and will enable an iterative "building block" approach. This building block approach will also enable the Field Test team to efficiently remobilize and restart delivery efforts during "pauses" in the project. Lead times and stakeholder buy-in for project may necessitate gaps between project tasks. The Implementation plan and delivery approach not only anticipates these potential pauses but accounts for them and minimizes their effect on the Field Test team's ability to seamlessly deliver value to SEP.

To address the requirements set forth by SEP, the Field Test team will develop a comprehensive project plan, organized by task, that will define overall project tasks and subtasks, assign personnel to the task completion, link task dependencies, identify task durations, and assign levels of effort to all tasks for SEP, the Field Test team and the participating stakeholders. The Project Manager will review the Project Plan with SEP and once confirmed, it will be used to actively track and report progress against the plan and provide estimates to complete. During the development of the project plan the Field Test team will work with SEP to confirm the selection of the trade lanes to be analyzed and initiate the communication with the stakeholders to solicit their feedback and insights, and generate their buy-in to the project. Hence, mobilization of this effort will begin as soon as the project is initiated.

Controlling the finances and adhering to SEP's reporting requirements is crucial for the success of the project and will be initiated after defining the project and completing a detailed project plan. After SEP approves the plan, including planned costs, schedule, and deliverables, the project manager will diligently monitor actual team effort, expenses and report progress and expenditures to SEP. As part of the management approach, the project manager will prepare monthly status reports showing project status, to include the following sections:

- **Schedule** – report the completion of milestones in accordance with the project plan;
- **Financial Status** – compare the planned expenditures to the actual expenditures and expected financial position at project completion.
- **Risks / Issues** – define any risks or issues that require management oversight and the potential impact to the project, escalating those issues as appropriate;
- **Other notes** – highlight key accomplishments to include project deliverables and upcoming activities.

When executing such a project, communication and outreach to stakeholders cannot be overlooked or underestimated as change enablement and stakeholder buy-in are critical to project success. During the earliest tasks of the engagement, the Field Test team will focus on change enablement and building a communication plan. The goal of the change enablement effort will be to reach out to key stakeholders, including the Brasilian ports, inland drayage service providers, terminal operator management and other constituencies apprised of status and aware of progress. Prior to the project, the Field Test team will work with SEP to develop an outreach plan, established in advance of the project start date.

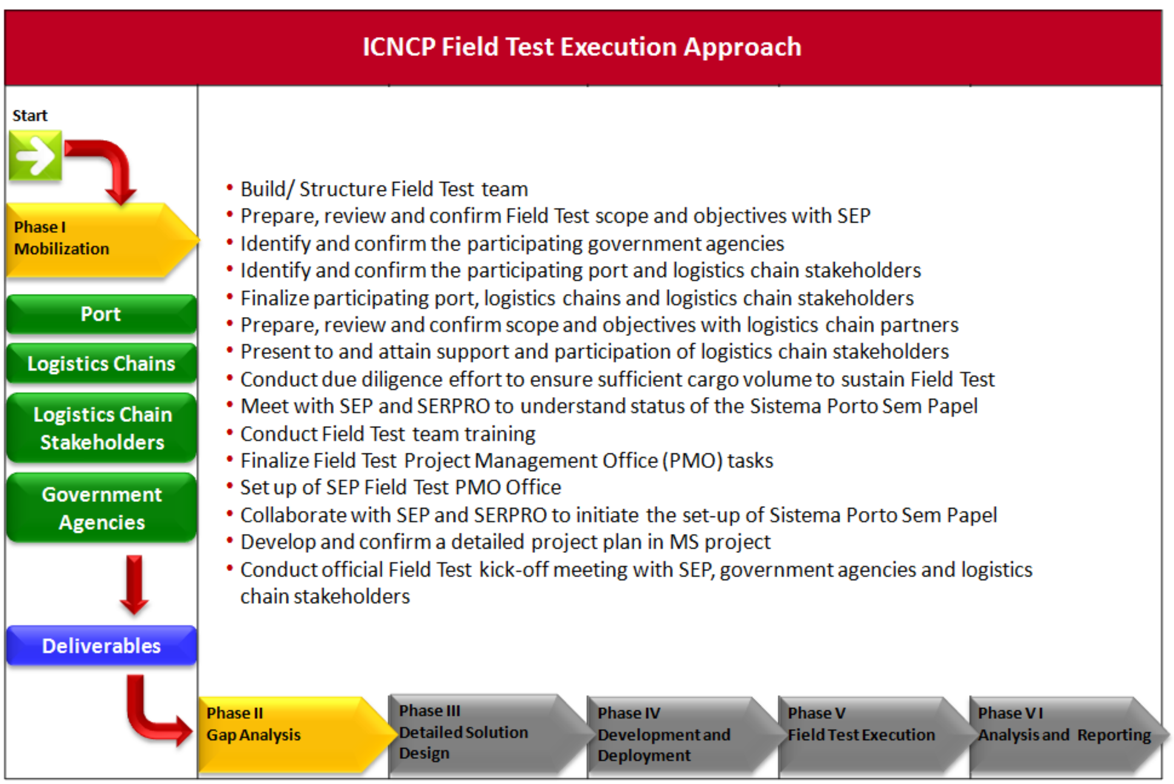


Figure – Phase I – Mobilization Execution Approach Overview

Implementation Schedule

For the successful execution of the ICNCP Field Test, it will be necessary for SEP and the Field Test team to have a flexible execution plan that lists out each of the tasks to be performed, the time estimate of the each of the tasks and the resource requirements for the successful execution of these tasks. Based on the requirements set forth by the TOR, the Unisys Team has developed a Microsoft Project based plan that documents the step by step process for SEP to execute the Mobilization phase of the ICNCP Field Test. Shown below is a snapshot of the high level task based plan created by the Unisys Team for the Mobilization phase.

	Task Name	Duration	Start	Finish	P
1	**ICNCP Field Test**	**284 days**	**Mon 3/7/11**	**Thu 4/5/12**	
2	Receive Go Ahead Letter from SEP	1 day	Mon 3/7/11	Mon 3/7/11	
3	**Phase I - Mobilization**	**25 days**	**Mon 3/7/11**	**Fri 4/8/11**	
4	**Build/Structure Team**	**1.5 days**	**Mon 3/7/11**	**Tue 3/8/11**	
5	Build ICNCP Field Test team straw-man	1 day	Mon 3/7/11	Mon 3/7/11	
6	Define Core team	0.5 days	Tue 3/8/11	Tue 3/8/11	5
7	Define Non-Core Team	0.5 days	Tue 3/8/11	Tue 3/8/11	
8	Define PMO Team	0.5 days	Tue 3/8/11	Tue 3/8/11	
9	Define roles and responsibilities	0.5 days	Tue 3/8/11	Tue 3/8/11	
10	**Organize Project**	**11.5 days**	**Tue 3/8/11**	**Wed 3/23/11**	**4**
11	Prepare and Review Scope document with SEP	1 day	Tue 3/8/11	Wed 3/9/11	
12	Confirm Field Test scope and objectives with SEP	1 day	Tue 3/8/11	Wed 3/9/11	
13	Identify and confirm the participating government agencies	1 day	Tue 3/8/11	Wed 3/9/11	
14	Finalize participating government agencies	1 day	Tue 3/8/11	Wed 3/9/11	
15	Finalize participating port, logistics chains and logistics chain stakeholders	3 days	Tue 3/8/11	Fri 3/11/11	
16	Present to and attain support and participation of government agencies	3 days	Fri 3/11/11	Wed 3/16/11	1
17	Present to and attain support and participation of logistics chain stakeholders	5 days	Wed 3/16/11	Wed 3/23/11	1
18	Prepare and review scope document with Logistics Chain Partners	5 days	Wed 3/16/11	Tue 3/22/11	
19	Confirm objective and scope with Logistics Chain Partners	5 days	Wed 3/16/11	Tue 3/22/11	
20	Finalize scope with SEP and Logistics Chain Partners	1 day	Wed 3/23/11	Wed 3/23/11	1
21	**Conduct Due Diligence**	**5 days**	**Fri 4/1/11**	**Fri 4/8/11**	**1**
22	**Verify Field Test logistics chain information**	**2 days**	**Fri 4/1/11**	**Tue 4/5/11**	
25	**Understand status of the Sistema Porto Sem Papel**	**3 days**	**Tue 4/5/11**	**Fri 4/8/11**	**2**
28	**Conduct Field Test team training**	**3 days**	**Wed 4/6/11**	**Fri 4/8/11**	**1**
29	Overall ICNCP Field Test project brief	1 day	Wed 4/6/11	Wed 4/6/11	
30	Integration training	1 day	Wed 4/6/11	Wed 4/6/11	
31	Sistema Porto Sem Papel training	1 day	Thu 4/7/11	Thu 4/7/11	3
32	Business process mapping training	1 day	Fri 4/8/11	Fri 4/8/11	3
33	Technology training	1 day	Fri 4/8/11	Fri 4/8/11	
34	Documentation standards training	1 day	Fri 4/8/11	Fri 4/8/11	
35	**Conduct Field Test PMO tasks**	**6.5 days**	**Thu 3/24/11**	**Fri 4/1/11**	**1**
36	**Set up SEP and Field Test PMO office**	**2 days**	**Thu 3/24/11**	**Fri 3/25/11**	
41	Share PMO information with Field Test team	2 days	Thu 3/24/11	Fri 3/25/11	
42	**Conduct on-going Project Management**	**6.5 days**	**Thu 3/24/11**	**Fri 4/1/11**	
43	**Project Plan**	**1 day**	**Thu 3/24/11**	**Thu 3/24/11**	
47	**Project Finances**	**0.5 days**	**Thu 3/24/11**	**Thu 3/24/11**	
49	**Project Status**	**1.5 days**	**Wed 3/30/11**	**Thu 3/31/11**	
54	**Project Communication**	**0.5 days**	**Fri 4/1/11**	**Fri 4/1/11**	
59	**Steering committee meetings**	**0.5 days**	**Fri 4/1/11**	**Fri 4/1/11**	
61	**Conduct Field Test Kick-Off meeting**	**1 day**	**Fri 4/1/11**	**Fri 4/1/11**	

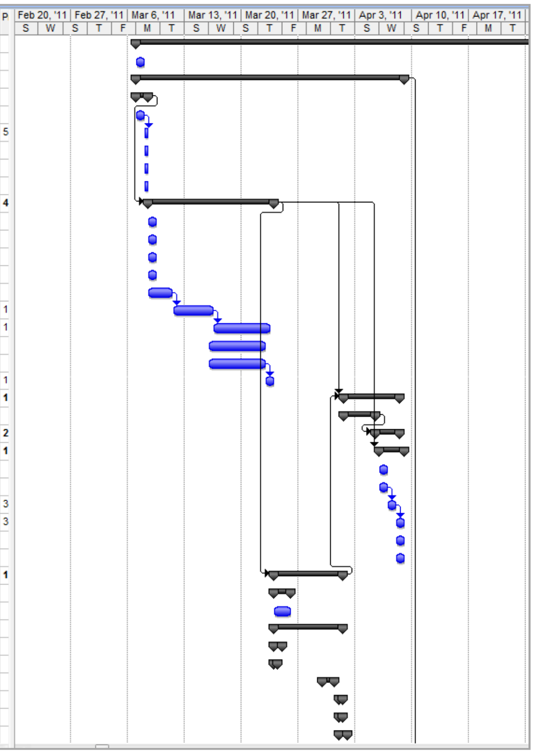


Figure – Phase I – Mobilization Task Based Plan

Phase II – Gap Analysis

After all the logistics chain stakeholders have been mobilized and the results of the ICNCP feasibility study have been reviewed and analyzed, a gap analysis must be performed of the selected logistics chains and the Sistema Porto Sem Papel framework. Shown below is the methodology and tasks the Field Test team will employ to execute Phase II – Gap Analysis phase.

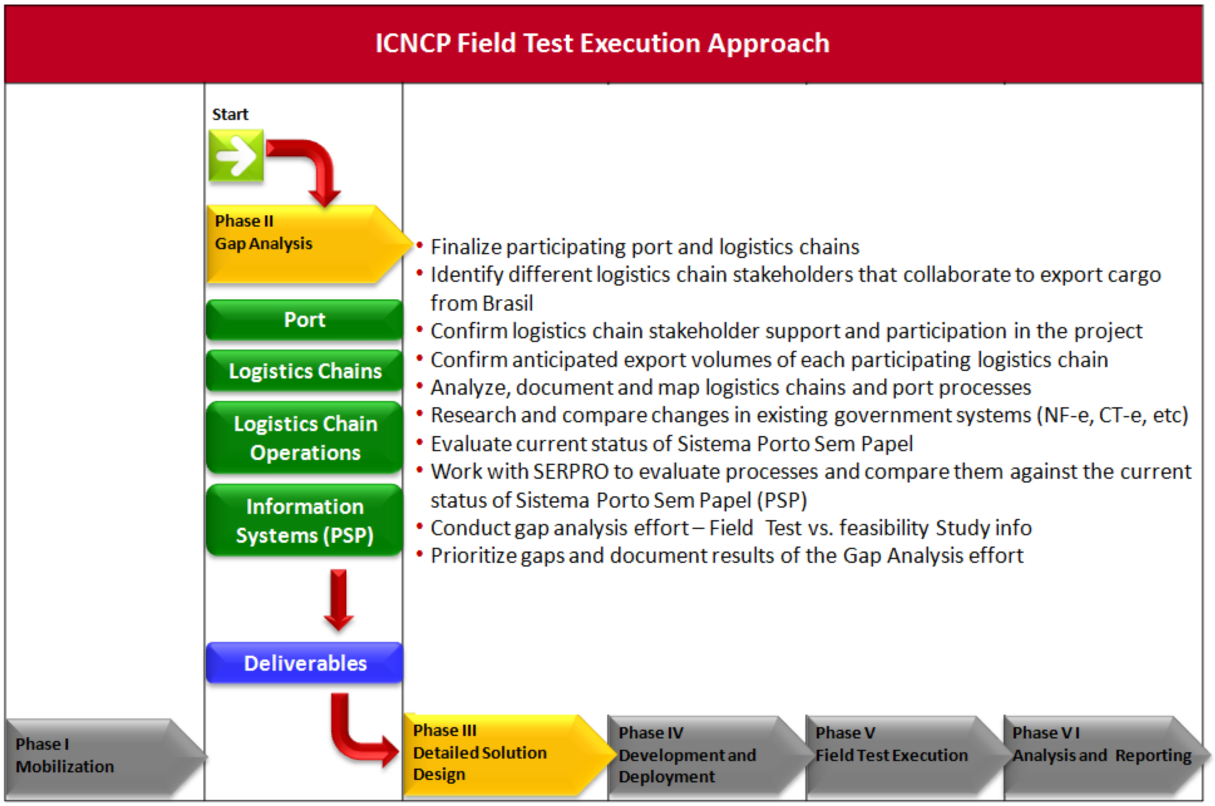


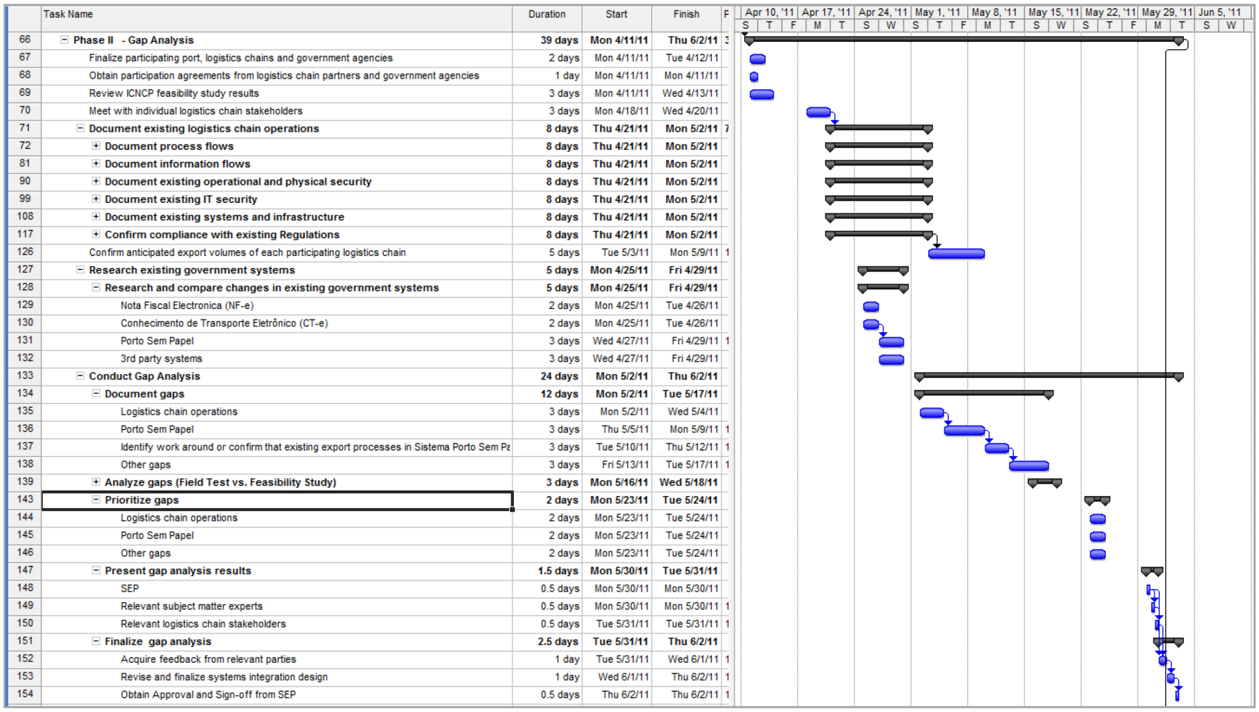
Figure – Phase II – Gap Analysis Execution Approach Overview

After agreeing to the final work plan at the kick-off meeting, the Field Test team will begin executing the project. The objective of the Phase II is to compare the baseline environment documented during the ICNCP feasibility study and the current logistics chains selected to participate in the Field Test, focusing on analyzing the current processes, systems, information exchanges and transactions, the existing infrastructure, the relevant operational scenarios and systems used for containerized cargo movement in Brasil and establishing the base requirements for ICNCP Field Test.

Implementation Schedule

For the successful execution of the ICNCP Field Test, it will be necessary for SEP and the Field Test team to have a flexible execution plan that lists out each of the tasks to be performed, the time estimate of the each of the tasks and the resource requirements for the successful execution of these tasks. Based on the requirements set forth by the TOR, the Unisys Team has developed a Microsoft Project based plan that documents the step by step process for SEP to execute the Gap Analysis phase of the ICNCP Field Test.

Shown below is a snapshot of the high level task based plan created by the Unisys Team for the Gap Analysis phase.



	Task Name	Duration	Start	Finish
66	**Phase II - Gap Analysis**	**39 days**	**Mon 4/11/11**	**Thu 6/2/11**
67	Finalize participating port, logistics chains and government agencies	2 days	Mon 4/11/11	Tue 4/12/11
68	Obtain participation agreements from logistics chain partners and government agencies	1 day	Mon 4/11/11	Mon 4/11/11
69	Review ICNCP feasibility study results	3 days	Mon 4/11/11	Wed 4/13/11
70	Meet with individual logistics chain stakeholders	3 days	Mon 4/18/11	Wed 4/20/11
71	**Document existing logistics chain operations**	**8 days**	**Thu 4/21/11**	**Mon 5/2/11**
72	**Document process flows**	**8 days**	**Thu 4/21/11**	**Mon 5/2/11**
81	**Document information flows**	**8 days**	**Thu 4/21/11**	**Mon 5/2/11**
90	**Document existing operational and physical security**	**8 days**	**Thu 4/21/11**	**Mon 5/2/11**
99	**Document existing IT security**	**8 days**	**Thu 4/21/11**	**Mon 5/2/11**
108	**Document existing systems and infrastructure**	**8 days**	**Thu 4/21/11**	**Mon 5/2/11**
117	**Confirm compliance with existing Regulations**	**8 days**	**Thu 4/21/11**	**Mon 5/2/11**
126	Confirm anticipated export volumes of each participating logistics chain	5 days	Tue 5/3/11	Mon 5/9/11
127	**Research existing government systems**	**5 days**	**Mon 4/25/11**	**Fri 4/29/11**
128	**Research and compare changes in existing government systems**	**5 days**	**Mon 4/25/11**	**Fri 4/29/11**
129	Nota Fiscal Electronica (NF-e)	2 days	Mon 4/25/11	Tue 4/26/11
130	Conhecimento de Transporte Eletrônico (CT-e)	2 days	Mon 4/25/11	Tue 4/26/11
131	Porto Sem Papel	3 days	Wed 4/27/11	Fri 4/29/11
132	3rd party systems	3 days	Wed 4/27/11	Fri 4/29/11
133	**Conduct Gap Analysis**	**24 days**	**Mon 5/2/11**	**Thu 6/2/11**
134	**Document gaps**	**12 days**	**Mon 5/2/11**	**Tue 5/17/11**
135	Logistics chain operations	3 days	Mon 5/2/11	Wed 5/4/11
136	Porto Sem Papel	3 days	Thu 5/5/11	Mon 5/9/11
137	Identify work around or confirm that existing export processes in Sistema Porto Sem Pa	3 days	Tue 5/10/11	Thu 5/12/11
138	Other gaps	3 days	Fri 5/13/11	Tue 5/17/11
139	**Analyze gaps (Field Test vs. Feasibility Study)**	**3 days**	**Mon 5/16/11**	**Wed 5/18/11**
143	**Prioritize gaps**	**2 days**	**Mon 5/23/11**	**Tue 5/24/11**
144	Logistics chain operations	2 days	Mon 5/23/11	Tue 5/24/11
145	Porto Sem Papel	2 days	Mon 5/23/11	Tue 5/24/11
146	Other gaps	2 days	Mon 5/23/11	Tue 5/24/11
147	**Present gap analysis results**	**1.5 days**	**Mon 5/30/11**	**Tue 5/31/11**
148	SEP	0.5 days	Mon 5/30/11	Mon 5/30/11
149	Relevant subject matter experts	0.5 days	Mon 5/30/11	Mon 5/30/11
150	Relevant logistics chain stakeholders	0.5 days	Tue 5/31/11	Tue 5/31/11
151	**Finalize gap analysis**	**2.5 days**	**Tue 5/31/11**	**Thu 6/2/11**
152	Acquire feedback from relevant parties	1 day	Tue 5/31/11	Wed 6/1/11
153	Revise and finalize systems integration design	1 day	Wed 6/1/11	Thu 6/2/11
154	Obtain Approval and Sign-off from SEP	0.5 days	Thu 6/2/11	Thu 6/2/11

Figure – Phase II – Gap Analysis Task Based Plan

Phase III – Detailed Solution Design

Utilizing the high-level design document prepared in feasibility study, the Field Teat team will develop detailed design schemata for the configuration, enhancement and integration of the Field Test solution and will initiate the implementation effort. This phase will focus both on the technology implementation (configuration, integration and testing) as well as process enhancement. The Field Test team will not re-engineer processes of the logistics chain partners, rather the enhanced measures will be designed into existing processes and will be enabled with the Field Test solution's technology devices. The enhanced processes for the Field Test is designed around a 'chain-of-custody', check-in/check-out responsibility transfer.

Once the Gap Analysis phase has been executed by the Field Test team, a detailed list of requirements that address processes and operations (functional requirements) and technologies and systems (technical requirements) needs to be documented via the Detailed Solution Design phase. These requirements will address integration with business processes, usability, integration, expected business and transaction volumes, required technology and hardware installations. In order to ensure participation of the logistics chain stakeholders and SERPRO, the Field Test team will work with the SEP, participating logistics chains and government agencies and SERPRO to develop the detailed functional and technical requirements. These requirements documents will be reviewed and approved by SEP. Using the high level design of the ICNCP and the approved detailed requirements, the selected technical advisor will build the detailed design. Additionally, the Field Test team will leverage the high level design created during the ICNCP feasibility study and develop a detailed design including business process changes, container monitoring mechanisms and integration of logistics chain systems for a successful Field Test deployment.

Considering the detailed solution design, the primary format of the data flow is assumed to be XML, regardless of the transport protocol or the interface method. This assumption also includes the EDI documents as most the external systems already deliver XML equivalent of the EDI documents. However, in situations where there is no XML equivalent for EDI documents, the EDI document will be passed as part of an XML schema and the EDI element(s) will be stripped from the XML document and passed to the input port of Sistema Porto Sem Papel. Another major design assumption is that the field devices have the ability to connect to the Field Test or Sistema Porto Sem Papel directly. The communication method and protocol might vary depending on the available local technological infrastructure. If wireless internet such as WiFi is available in the local area of the device operation, then those wireless technology advantages will be utilized. In places where wireless connectivity is not available or reliable, all the pertaining data would be collected within the field device in a batch-mode. The device will then be placed in a cradle for data transport. The cradles are assumed to be connected to the Internet through landline and are reliable enough to connect to the Field Test system.

The following characteristics of the Field Test design have been described below in the priority that they have been assigned: Reliability, Security, Scalability, Availability and Performance.

- **Reliability** has been assigned top priority. It is defined as "Data integrity & durability". Hashing & signing messages will do accomplishing very high reliability. Other strategies that will be employed are saving all messages to the database before they are processed and before an acknowledgement is sent back to the client. Each message will be equipped with a unique identifier to ensure "once and only once" processing of messages. All messages are processed in a transactional fashion
- **Security** is the number two priority of the ICNCP Field Test Design and is defined as "No un-authorized access to the system". Ensuring a highly secure system will require numerous different strategies, as follows:
    - Auditing user access & actions
    - Usercode /password or PKI / certificate
    - Signing / Encrypting messages where applicable
    - Secure Web Portal / Web Service
    - Secure Integration Web services by signing
    - Secure the backend DB by allowing only authentication with strict user access policy
    - Hardware design that only allows access to the database by the Integration servers. The Web Services servers that are Internet-facing will not have access to the database.

- **Availability** is prioritized next in the list and is defined as "High up-time. System constantly ready and available to receive information." Availability requirements will differ for the different layers of the system architecture. Web Services (client-facing application) should have a 99.9% availability requirement while the integration layer and Sistema Porto Sem Papel database layer need near 100% availability.

- **Performance** has been prioritized as last among these five factors. It is defined as "the number of transactions through the system in a given time period." The reasons for putting this item last are mainly a relatively low volume of transactions expected. Because of this, there is low hardware requirement for performance (other factors such as reliability may force higher hardware requirements). The one item with regard to performance that is critical is the expeditious delivery of collected data, which is in respect to the Web Services application(s). They must quickly receive, save and respond to each message sent. Once the message is saved, it may or may not be actioned by the Integration software in a quick manner, but the message will not be lost and the client will not be waiting for a response for an extended period of time

Shown below is the methodology and tasks the Field Test team will employ to execute Phase III – Detailed Solution Design.

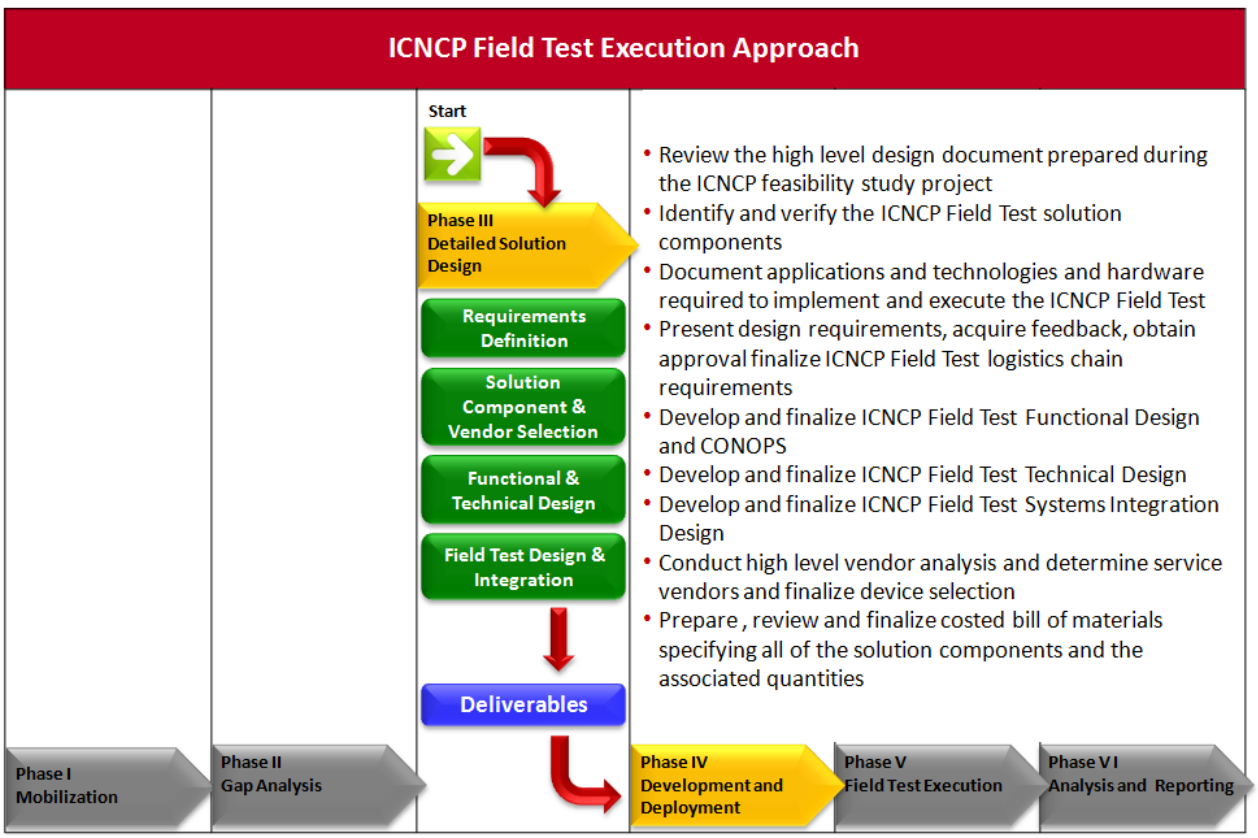


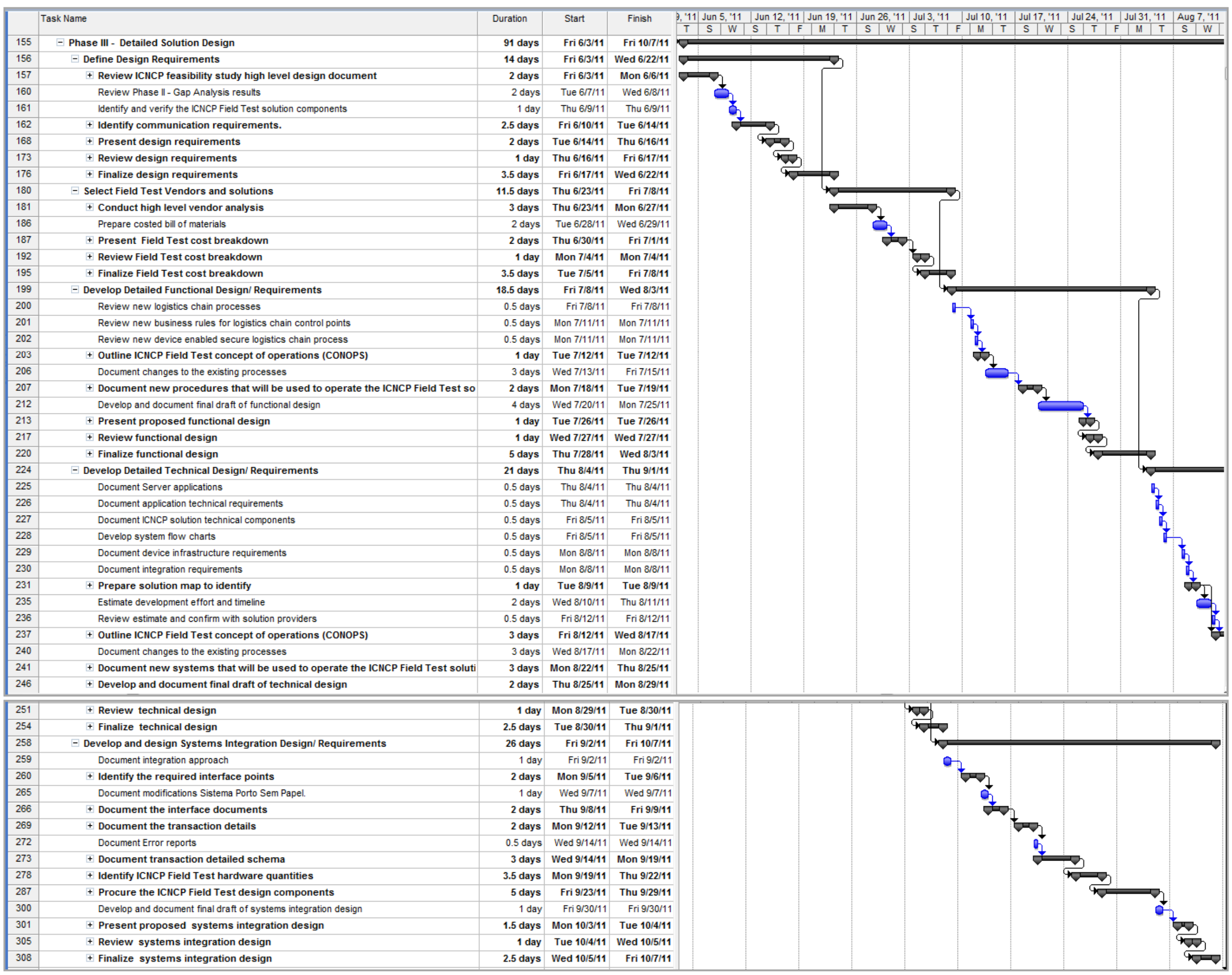
Figure – Phase III – Detailed Solution Design Execution Approach Overview

Due to the nature of the system and areas of responsibility, the ICNCP Field Test team will have to set up an agreement on a development plan and timeframe with SERPRO and monitor the tasks during the development phase. It is assumed that SERPRO management and SEP will assume responsibility for the development of Porto Sem Papel components under SERPRO's area of responsibility but the ICNCP Field Test team will monitor progress and report on risks, and identified delays to SEP who will enforce corrective action.

Implementation Schedule

For the successful execution of the ICNCP Field Test, it will be necessary for SEP and the Field Test team to have a flexible execution plan that lists out each of the tasks to be performed, the time estimate of the each of the tasks and the resource requirements for the successful execution of these tasks. Based on the requirements set forth by the TOR, the Unisys Team has developed a Microsoft Project based plan that documents the step by step process for SEP to execute the Detailed Solution Design phase of the ICNCP Field Test.

Shown below is a snapshot of the high level task based plan created by the Unisys Team for the Detailed Solution Design phase.



	Task Name	Duration	Start	Finish
155	Phase III - Detailed Solution Design	91 days	Fri 6/3/11	Fri 10/7/11
156	Define Design Requirements	14 days	Fri 6/3/11	Wed 6/22/11
157	Review ICNCP feasibility study high level design document	2 days	Fri 6/3/11	Mon 6/6/11
160	Review Phase II - Gap Analysis results	2 days	Tue 6/7/11	Wed 6/8/11
161	Identify and verify the ICNCP Field Test solution components	1 day	Thu 6/9/11	Thu 6/9/11
162	Identify communication requirements.	2.5 days	Fri 6/10/11	Tue 6/14/11
168	Present design requirements	2 days	Tue 6/14/11	Thu 6/16/11
173	Review design requirements	1 day	Thu 6/16/11	Fri 6/17/11
176	Finalize design requirements	3.5 days	Fri 6/17/11	Wed 6/22/11
180	Select Field Test Vendors and solutions	11.5 days	Thu 6/23/11	Fri 7/8/11
181	Conduct high level vendor analysis	3 days	Thu 6/23/11	Mon 6/27/11
186	Prepare costed bill of materials	2 days	Tue 6/28/11	Wed 6/29/11
187	Present Field Test cost breakdown	2 days	Thu 6/30/11	Fri 7/1/11
192	Review Field Test cost breakdown	1 day	Mon 7/4/11	Mon 7/4/11
195	Finalize Field Test cost breakdown	3.5 days	Tue 7/5/11	Fri 7/8/11
199	Develop Detailed Functional Design/ Requirements	18.5 days	Fri 7/8/11	Wed 8/3/11
200	Review new logistics chain processes	0.5 days	Fri 7/8/11	Fri 7/8/11
201	Review new business rules for logistics chain control points	0.5 days	Mon 7/11/11	Mon 7/11/11
202	Review new device enabled secure logistics chain process	0.5 days	Mon 7/11/11	Mon 7/11/11
203	Outline ICNCP Field Test concept of operations (CONOPS)	1 day	Tue 7/12/11	Tue 7/12/11
206	Document changes to the existing processes	3 days	Wed 7/13/11	Fri 7/15/11
207	Document new procedures that will be used to operate the ICNCP Field Test so	2 days	Mon 7/18/11	Tue 7/19/11
212	Develop and document final draft of functional design	4 days	Wed 7/20/11	Mon 7/25/11
213	Present proposed functional design	1 day	Tue 7/26/11	Tue 7/26/11
217	Review functional design	1 day	Wed 7/27/11	Wed 7/27/11
220	Finalize functional design	5 days	Thu 7/28/11	Wed 8/3/11
224	Develop Detailed Technical Design/ Requirements	21 days	Thu 8/4/11	Thu 9/1/11
225	Document Server applications	0.5 days	Thu 8/4/11	Thu 8/4/11
226	Document application technical requirements	0.5 days	Thu 8/4/11	Thu 8/4/11
227	Document ICNCP solution technical components	0.5 days	Fri 8/5/11	Fri 8/5/11
228	Develop system flow charts	0.5 days	Fri 8/5/11	Fri 8/5/11
229	Document device infrastructure requirements	0.5 days	Mon 8/8/11	Mon 8/8/11
230	Document integration requirements	0.5 days	Mon 8/8/11	Mon 8/8/11
231	Prepare solution map to identify	1 day	Tue 8/9/11	Tue 8/9/11
235	Estimate development effort and timeline	2 days	Wed 8/10/11	Thu 8/11/11
236	Review estimate and confirm with solution providers	0.5 days	Fri 8/12/11	Fri 8/12/11
237	Outline ICNCP Field Test concept of operations (CONOPS)	3 days	Fri 8/12/11	Wed 8/17/11
240	Document changes to the existing processes	3 days	Wed 8/17/11	Mon 8/22/11
241	Document new systems that will be used to operate the ICNCP Field Test soluti	3 days	Mon 8/22/11	Thu 8/25/11
246	Develop and document final draft of technical design	2 days	Thu 8/25/11	Mon 8/29/11
251	Review technical design	1 day	Mon 8/29/11	Tue 8/30/11
254	Finalize technical design	2.5 days	Tue 8/30/11	Thu 9/1/11
258	Develop and design Systems Integration Design/ Requirements	26 days	Fri 9/2/11	Fri 10/7/11
259	Document integration approach	1 day	Fri 9/2/11	Fri 9/2/11
260	Identify the required interface points	2 days	Mon 9/5/11	Tue 9/6/11
265	Document modifications Sistema Porto Sem Papel.	1 day	Wed 9/7/11	Wed 9/7/11
266	Document the interface documents	2 days	Thu 9/8/11	Fri 9/9/11
269	Document the transaction details	2 days	Mon 9/12/11	Tue 9/13/11
272	Document Error reports	0.5 days	Wed 9/14/11	Wed 9/14/11
273	Document transaction detailed schema	3 days	Wed 9/14/11	Mon 9/19/11
278	Identify ICNCP Field Test hardware quantities	3.5 days	Mon 9/19/11	Thu 9/22/11
287	Procure the ICNCP Field Test design components	5 days	Fri 9/23/11	Thu 9/29/11
300	Develop and document final draft of systems integration design	1 day	Fri 9/30/11	Fri 9/30/11
301	Present proposed systems integration design	1.5 days	Mon 10/3/11	Tue 10/4/11
305	Review systems integration design	1 day	Tue 10/4/11	Wed 10/5/11
308	Finalize systems integration design	2.5 days	Wed 10/5/11	Fri 10/7/11

Figure – Phase III – Detailed Solution Design Task Based Plan

Phase IV – Development and Deployment

After the detailed design has been reviewed and approved, the Field Test team will develop an deploy the Field Test design as well as coordinate with SERPRO in its development and deployment of the Porto Sem Papel components for which it is responsible. The ICNCP Field Test is designed to consider both the processes as well as technological aspects of safe guarding Brasilian export logistics chains. While the earlier phases will be focused on the specific process and technological factors of the selected logistics chains, the development and deployment phase will be focused on providing the technology platform to host the specific Field Test solution. In attempting to provide the foundation platform, the ICNCP Field Test team will also look into developing and implementing the sub-systems that will be applicable for all the participating logistics chains.

After thorough analysis of the selected vendors and their interface technologies, the Field Test team will develop a carry-through, tunnel-like Application Programmable Interface (API). The input portion of the API will collect data from external systems such as NF-e, CT-e, Vessel Carrier systems, check-in, check-out systems and field devices such as handheld units. The output portion will be primarily to feed the converted data to Sistema Porto Sem Papel. The deployment portion of the ICNCP Field Test will consist of three (3) primary layers: 1) the data capture layer, 2) the message transmission/transformation layer, and 3) the risk analytics and cargo visibility layer via Sistema Porto Sem Papel. During the development phase, the Field Test team will follow standard or best practice documentation and change control standards for the development of the solutions as well as document the final version data schemas. The development stage of this project will include the testing of all components and a brief operational test prior to Go-Live so that SEP can have sufficient confidence that the solution will operate correctly. The testing process should include industry standard testing processes and documentation to include but not limited to:

- Unit testing
- Integration testing
- System testing
- Acceptance testing and
- Final brief operational test of a small number of shipments.

The data capture layer is the point at which security status about the container and its cargo characteristics are gathered. Data capture technologies exist throughout the logistics chain and will be deployed at each control point of the export logistics chain. Data capture will be enabled by the use of electronic forms deployed using electronic forms, bar code technology, handheld computers, inspection services, container monitoring mechanisms and data integration from a third party shipping portals. The message transmission/transformation layer will be responsible for brokering (accumulating, assimilating, transforming) the information from the data capture layer to the data analytics layer of Sistema Porto Sem Papel. Information will be gathered in this layer and securely transmitted via the internet or via custom web services using XML as the standard data format protocol. Once the information will be received via these transmissions, the data transmission/ transformation layer will perform three functions.

- Verify and validate the contents of inbound messages for accuracy and completeness
- Create an informational message that will be forwarded to select logistics chain partners providing visibility/notification into the position and status of the container and its cargo
- Transform and deliver the information to the risk analytics layer within Sistema Porto Sem Papel.

This phase will also include solution testing (technology and process) and will include unit and integration testing, two rounds of system test activities and a field simulation test or prototype deployment. The Field Test team will work with SEP, SERPRO and the logistics chain partners to formalize and disseminate the new policies and procedures. Field Test users will be selected during from each logistics chain partner and will be trained in the execution of the new technology enabled processes and notification procedures. The technology components of the Field Test solution and the local supporting infrastructure will be of the solution will be installed in each supply chain node in preparation of deployment. Once solution components have been deployed and Field Test personnel trained, SEP and the Field Test team will select a shipment to commence ‘Go Live’ activities.

Shown below is the methodology and tasks the Field Test team will employ to execute Phase I – Mobilization.

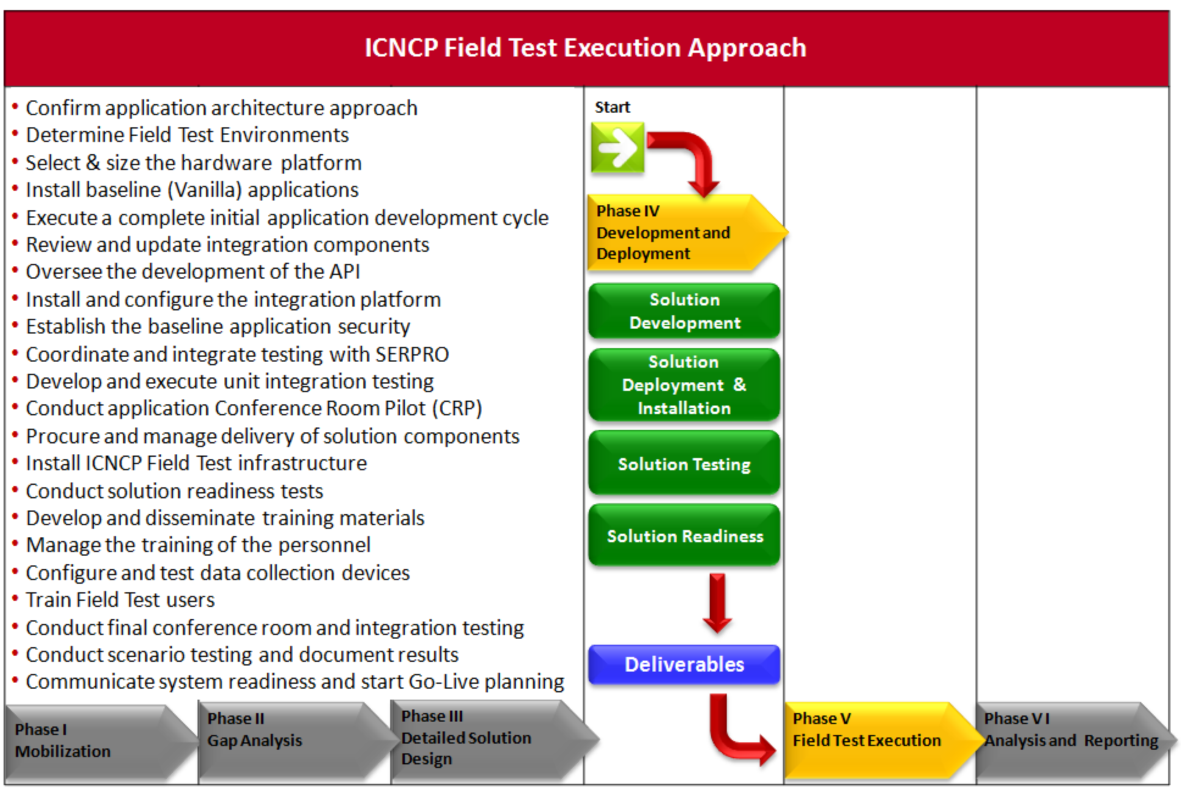


Figure – Phase IV – Development and Deployment Execution Approach Overview

Implementation Schedule
For the successful execution of the ICNCP Field Test, it will be necessary for SEP and the Field Test team to have a flexible execution plan that lists out each of the tasks to be performed, the time estimate of the each of the tasks and the resource requirements for the successful execution of these tasks. Based on the requirements set forth by the TOR, the Unisys Team has developed a Microsoft Project based plan that documents the step by step process for SEP to undertake the Development and Deployment phase of the ICNCP Field Test.

Shown below is a snapshot of the high level task based plan created by the Unisys Team for the Development and Deployment phase.

	Task Name	Duration	Start	Finish
312	**Phase IV - Development and Deployment**	**60 days**	**Mon 10/10/11**	**Fri 12/30/11**
313	**Develop ICNCP Field Test solution**	**26 days**	**Mon 10/10/11**	**Mon 11/14/11**
314	Confirm application architecture approach	1 day	Mon 10/10/11	Mon 10/10/11
315	Establish server based technology applications	3 days	Mon 10/10/11	Wed 10/12/11
316	**Determine Field Test Environments**	**3 days**	**Thu 10/13/11**	**Mon 10/17/11**
320	**Select & size the hardware platform**	**7 days**	**Thu 10/13/11**	**Fri 10/21/11**
323	**Install baseline (Vanilla) applications**	**2 days**	**Mon 10/24/11**	**Tue 10/25/11**
328	**Install 3rd Party (Device) Applications**	**5 days**	**Mon 10/10/11**	**Fri 10/14/11**
334	Install and configure the integration platform	2 days	Mon 10/10/11	Tue 10/11/11
335	Design integration components	3 days	Wed 10/12/11	Fri 10/14/11
336	Define the application integration approach	2 days	Mon 10/17/11	Tue 10/18/11
337	**Build integration adapters**	**2 days**	**Wed 10/19/11**	**Thu 10/20/11**
343	Review and update integration components	3 days	Fri 10/21/11	Tue 10/25/11
344	**Establish baseline application security**	**2 days**	**Tue 10/18/11**	**Wed 10/19/11**
349	Coordinate and integrate testing with SERPRO	5 days	Thu 10/20/11	Wed 10/26/11
350	Provide guidance and insights to User Interface (UI) tasks	5 days	Thu 10/20/11	Wed 10/26/11
351	**Monitor Sistema Porto Sem Papel interface development**	**5 days**	**Thu 10/27/11**	**Wed 11/2/11**
355	Report on risks, delays and overall status to SEP	5 days	Thu 10/27/11	Wed 11/2/11
356	Develop unit integration test planning	1 day	Fri 10/21/11	Fri 10/21/11
357	Execute unit testing of integration components	1 day	Fri 10/21/11	Fri 10/21/11
358	**Conduct application Conference Room Pilot (CRP)**	**2 days**	**Thu 11/3/11**	**Fri 11/4/11**
362	Incorporate CRP feedback	0.5 days	Mon 11/7/11	Mon 11/7/11
363	Develop unit integration test planning	3 days	Mon 11/7/11	Thu 11/10/11
364	Execute unit testing of integration components	2 days	Thu 11/10/11	Mon 11/14/11
365	**Revise Field Test applications**	**0.5 days**	**Mon 11/14/11**	**Mon 11/14/11**
369	**Deploy ICNCP Field Test Solution**	**34 days**	**Tue 11/15/11**	**Fri 12/30/11**
370	Procure hardware and software solution components	1 day	Tue 11/15/11	Tue 11/15/11
371	Manage delivery of hardware and software solution components	1 day	Wed 11/16/11	Wed 11/16/11
372	Establish logistics chain infrastructure baseline	1 day	Thu 11/17/11	Thu 11/17/11
373	**Install ICNCP Field Test infrastructure**	**6 days**	**Fri 11/18/11**	**Fri 11/25/11**
380	**Manage the deployment of the selected hardware to the field to the logistics ch**	**4 days**	**Mon 11/28/11**	**Thu 12/1/11**
385	**Develop Testing Plan**	**3 days**	**Fri 12/2/11**	**Tue 12/6/11**
388	**Conduct hardware testing**	**3 days**	**Wed 12/7/11**	**Fri 12/9/11**
392	**Conduct solution readiness testing**	**3 days**	**Mon 12/12/11**	**Wed 12/14/11**
395	Record and report the solution readiness results to SEP	3 days	Thu 12/15/11	Mon 12/19/11
396	**Establish Training Approach**	**3 days**	**Tue 12/20/11**	**Thu 12/22/11**
406	**Conduct logistics chain stakeholder training**	**1 day**	**Fri 12/23/11**	**Fri 12/23/11**
410	**Conduct Brasilian government personnel training**	**1 day**	**Fri 12/23/11**	**Fri 12/23/11**
414	**Conduct Field Test personnel training**	**1 day**	**Fri 12/23/11**	**Fri 12/23/11**
418	Configure and test data collection devices	1 day	Mon 12/26/11	Mon 12/26/11
419	**Conduct final conference room testing**	**1 day**	**Tue 12/27/11**	**Tue 12/27/11**
426	Update process/devices	1 day	Wed 12/28/11	Wed 12/28/11
427	Communicate system readiness to SEP	1 day	Thu 12/29/11	Thu 12/29/11
428	Initiate Go-Live planning	1 day	Fri 12/30/11	Fri 12/30/11

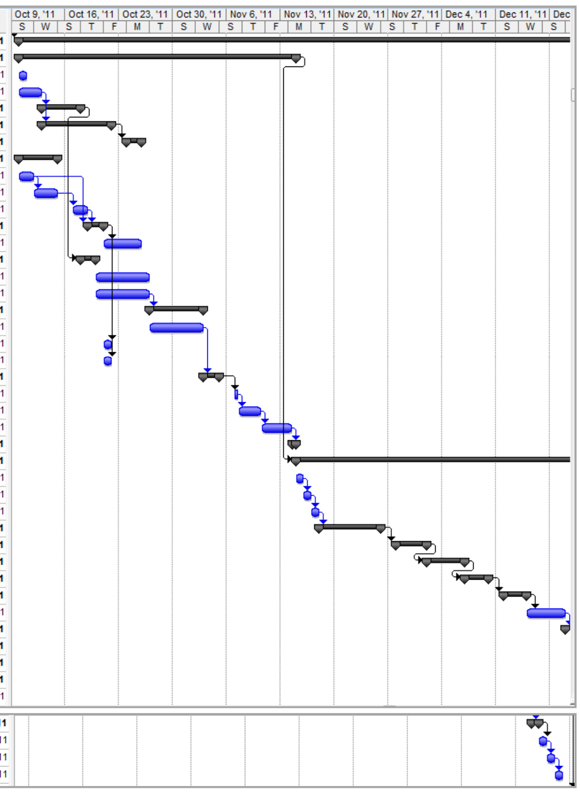


Figure – Phase IV – Development and Deployment Task Based Plan

Phase V – Field Test Execution

The Field Test Execution phase will start with a set of operational system tests to confirm the overall scalability and strength of the ICNCP Field Test solution. After SEP has reviewed the results of the brief operational test and provided authorization to proceed, the ICNCP Field Test will begin. The critical components of the field test will include testing the solution over export shipment volumes across the entire logistics chain.

The ICNCP Field Test will provide support to the logistics chain participants, but after the initial post implementation support period, the Field Test team will not operate the solution on the logistics chain participant's behalf. The objective of this phase is to test the overall ICNCP Field Test solution by managing the shipments through the export logistics chain.

Shown below is the methodology and tasks the Field Test team will employ to execute Phase I – Mobilization.

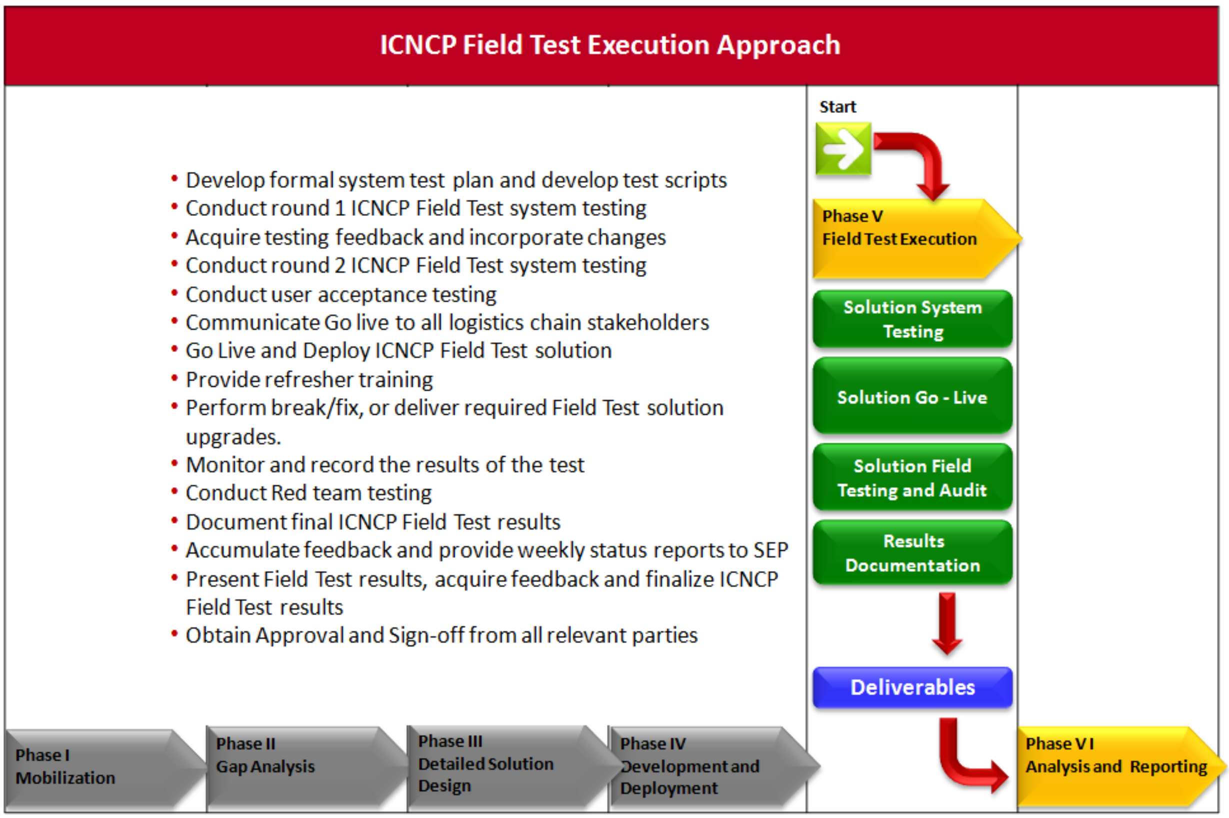


Figure – Phase V – Field Test Execution Approach Overview

The ICNCP Field Test team will remain the principal point of contact with the logistics chain participants and will provide call-in phone support and will dispatch / manage break fix teams to resolve data collection infrastructure and/or shipment tracking device issues

Implementation Schedule

For the successful execution of the ICNCP Field Test, it will be necessary for SEP and the Field Test team to have a flexible execution plan that lists out each of the tasks to be performed, the time estimate of the each of the tasks and the resource requirements for the successful execution of these tasks. Based on the requirements set forth by the TOR, the Unisys Team has developed a

Microsoft Project based plan that documents the step by step process for SEP to undertake the Field Test Execution phase of the ICNCP Field Test.

Shown below is a snapshot of the high level task based plan created by the Unisys Team for the Field Test Execution phase.

	Task Name	Duration	Start	Finish
429	**Phase V - Field Test Execution**	**45 days**	**Mon 1/2/12**	**Fri 3/2/12**
430	Develop formal system test plan	1 day	Mon 1/2/12	Mon 1/2/12
431	Develop test scripts	2 days	Mon 1/2/12	Tue 1/3/12
432	**Conduct Field/String (End-to-End) Testing**	**1 day**	**Mon 1/2/12**	**Mon 1/2/12**
436	**Conduct round 1 ICNCP Field Test system testing**	**5 days**	**Mon 1/2/12**	**Fri 1/6/12**
450	**Conduct round 2 ICNCP Field Test system testing**	**2 days**	**Mon 1/9/12**	**Tue 1/10/12**
455	Communicate Go live to all logistics chain stakeholders	1 day	Wed 1/11/12	Wed 1/11/12
456	Select initial container to "Go Live"	1 day	Thu 1/12/12	Thu 1/12/12
457	Deploy ICNCP Field Test solution	1 day	Fri 1/13/12	Fri 1/13/12
458	**Provide on-site support**	**30 days**	**Mon 1/16/12**	**Fri 2/24/12**
461	**Provide refresher training**	**1 day**	**Mon 1/2/12**	**Mon 1/2/12**
464	Perform break/fix tasks	15 days	Mon 1/2/12	Fri 1/20/12
465	Deliver required Field Test solution upgrades	2 days	Mon 1/2/12	Tue 1/3/12
466	**Monitor and record the test results**	**30 days**	**Fri 1/13/12**	**Thu 2/23/12**
467	Success data	30 days	Fri 1/13/12	Thu 2/23/12
468	Failure data	30 days	Fri 1/13/12	Thu 2/23/12
469	Lessons learned	30 days	Fri 1/13/12	Thu 2/23/12
470	**Conduct Red team testing**	**5 days**	**Mon 1/23/12**	**Fri 1/27/12**
471	Determine scope of security audit with SEP	5 days	Mon 1/23/12	Fri 1/27/12
472	Conduct Security Test Audit	5 days	Mon 1/23/12	Fri 1/27/12
473	Develop reporting mechanisms that track the read rate / failure rate of the container monito	5 days	Mon 1/23/12	Fri 1/27/12
474	**Document final ICNCP Field Test results**	**30 days**	**Fri 1/13/12**	**Thu 2/23/12**
475	Cargo volumes	30 days	Fri 1/13/12	Thu 2/23/12
476	Technologies used	30 days	Fri 1/13/12	Thu 2/23/12
477	Processes	30 days	Fri 1/13/12	Thu 2/23/12
478	People: Security alert response	30 days	Fri 1/13/12	Thu 2/23/12
479	Solution effectiveness	30 days	Fri 1/13/12	Thu 2/23/12
480	Accumulate feedback, status, and projected shipment volumes	30 days	Fri 1/13/12	Thu 2/23/12
481	**Provide status report to SEP**	**39 days**	**Mon 1/2/12**	**Thu 2/23/12**
482	Shipment volumes	30 days	Fri 1/13/12	Thu 2/23/12
483	Read rate percentages	30 days	Fri 1/13/12	Thu 2/23/12
484	**API Integration statistics**	**30 days**	**Mon 1/2/12**	**Fri 2/10/12**
488	Address execution issues	30 days	Fri 1/13/12	Thu 2/23/12
489	**Present Field Test results**	**0.5 days**	**Fri 2/24/12**	**Fri 2/24/12**
490	SEP	0.5 days	Fri 2/24/12	Fri 2/24/12
491	Logisitcs Chain stakeholders	0.5 days	Fri 2/24/12	Fri 2/24/12
492	Government agencies	0.5 days	Fri 2/24/12	Fri 2/24/12
493	**Finalize Field Test results**	**5.5 days**	**Fri 2/24/12**	**Fri 3/2/12**

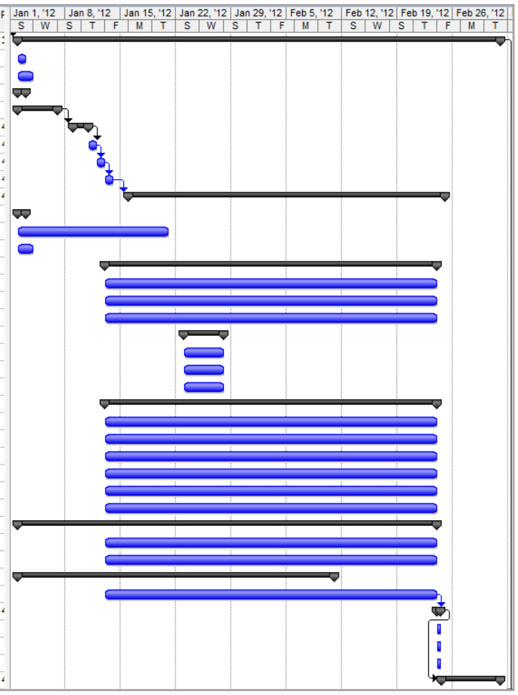


Figure – Phase V – Field Test Execution Task Based Plan

Phase VI – Analysis and Reporting

The Analysis and Reporting phase will focus on conveying the overall status of the ICNCP Field Test solution and its acceptance by the participating logistics chains and identify critical issues, risks, and potential points of failure. In addition, in order to support a sound business case for future deployments, the final report will include an impact assessment that identifies the solution costs of the system as well as its impact or potential impact to the Brasilian export market if it is fully deployed. The objective of this phase is to analyze and report the results of the entire engagement.

The report should provide an overall description of the solution deployed in the participating logistics chains; address the requirements of a "low-tech / low-cost" solution based upon a series of "layered" processes and technologies and communicate that the ICNCP Field Test solution is designed to provide a higher degree of [container] location and security status visibility from one control point to another, thus enhancing security with a process enhanced and technology enabled "chain-of-custody."

The ICNCP Field Test team will also execute certain tasks in order to accurately describe the effectiveness of the ICNCP Field Test solution. As part of the analysis effort, each solution component will be assessed from both a reliability and efficacy perspective based on the following definitions:

- **Reliability** – The degree to which a technology, process or person performed as designed (or instructed) on a consistent basis. (Example: XYZ device worked as designed X% of the time).
- **Effectiveness** – The degree to which a design or instruction, when performing reliably, was effective in reducing the risk or solving the problem for which it was deployed. (Example: The use of XYZ device to monitor the Brazil terminal arrival process completed successfully providing a deterrence factor)

Using these definitions, it was possible for a component of the solution to operate reliably yet still be ineffective. However, poor reliability degraded (reduced the rating) solution components' efficacy. Shown below is the methodology and tasks the Field Test team will employ to execute Phase VI – Analysis and Reporting.

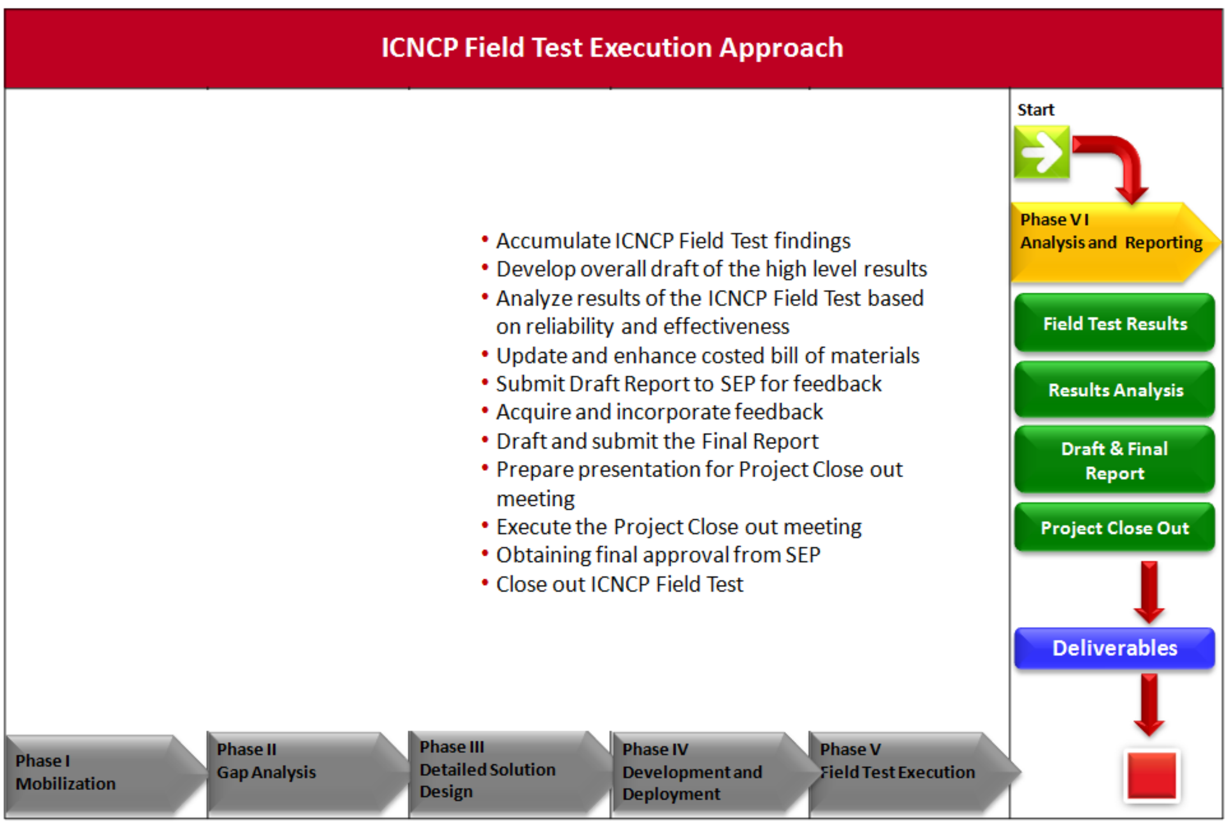
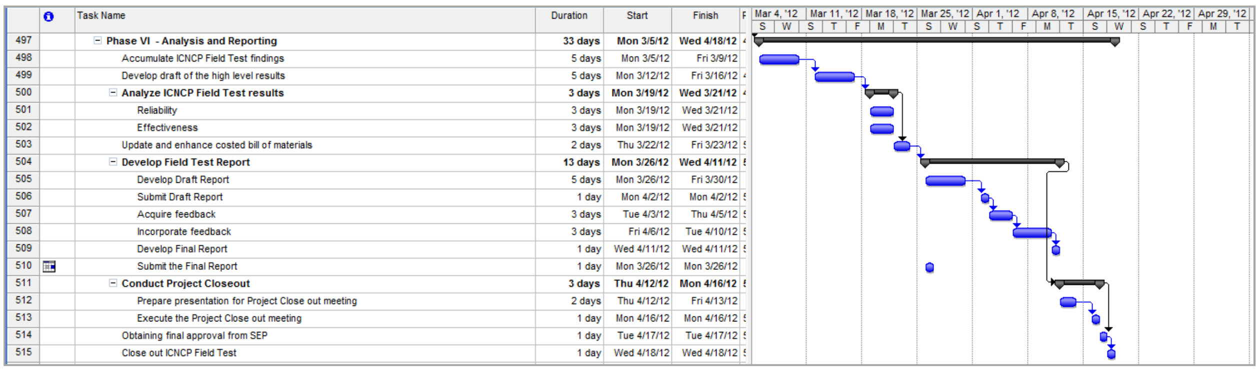


Figure – Phase VI – Reporting Execution Approach Overview

Implementation Schedule

For the successful execution of the ICNCP Field Test, it will be necessary for SEP and the Field Test team to have a flexible execution plan that lists out each of the tasks to be performed, the time estimate of the each of the tasks and the resource requirements for the successful execution of these tasks. Based on the requirements set forth by the TOR, the Unisys Team has developed a Microsoft Project based plan that documents the step by step process for SEP to undertake to execute the Analysis and Reporting phase of the ICNCP Field Test.

Shown below is a snapshot of the high level task based plan created by the Unisys Team for the Analysis and Reporting phase.



		Task Name	Duration	Start	Finish
497		Phase VI - Analysis and Reporting	33 days	Mon 3/5/12	Wed 4/18/12
498		Accumulate ICNCP Field Test findings	5 days	Mon 3/5/12	Fri 3/9/12
499		Develop draft of the high level results	5 days	Mon 3/12/12	Fri 3/16/12
500		Analyze ICNCP Field Test results	3 days	Mon 3/19/12	Wed 3/21/12
501		Reliability	3 days	Mon 3/19/12	Wed 3/21/12
502		Effectiveness	3 days	Mon 3/19/12	Wed 3/21/12
503		Update and enhance costed bill of materials	2 days	Thu 3/22/12	Fri 3/23/12
504		Develop Field Test Report	13 days	Mon 3/26/12	Wed 4/11/12
505		Develop Draft Report	5 days	Mon 3/26/12	Fri 3/30/12
506		Submit Draft Report	1 day	Mon 4/2/12	Mon 4/2/12
507		Acquire feedback	3 days	Tue 4/3/12	Thu 4/5/12
508		Incorporate feedback	3 days	Fri 4/6/12	Tue 4/10/12
509		Develop Final Report	1 day	Wed 4/11/12	Wed 4/11/12
510		Submit the Final Report	1 day	Mon 3/26/12	Mon 3/26/12
511		Conduct Project Closeout	3 days	Thu 4/12/12	Mon 4/16/12
512		Prepare presentation for Project Close out meeting	2 days	Thu 4/12/12	Fri 4/13/12
513		Execute the Project Close out meeting	1 day	Mon 4/16/12	Mon 4/16/12
514		Obtaining final approval from SEP	1 day	Tue 4/17/12	Tue 4/17/12
515		Close out ICNCP Field Test	1 day	Wed 4/18/12	Wed 4/18/12

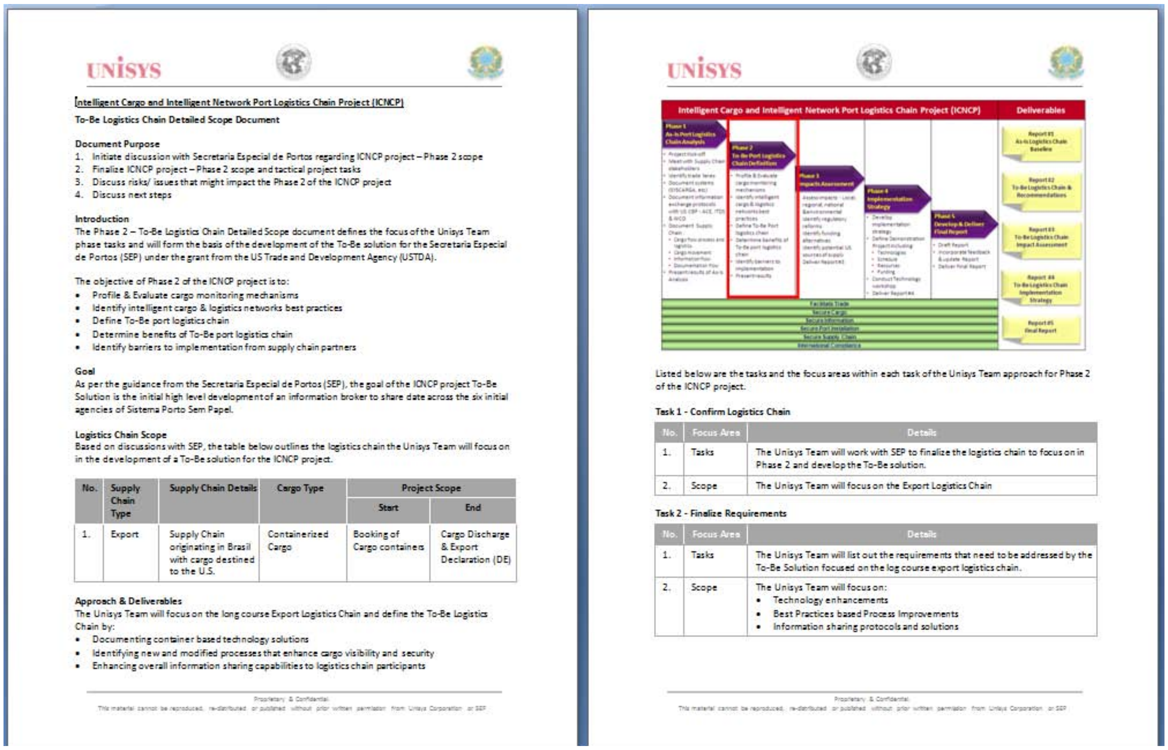
Figure – Phase VI – Analysis and Reporting Task Based Plan

2.4.2 Documentation and project status requirements

Phase I – Mobilization

The tasks performed by the Field Test team during the Mobilization phase will lead to the generation of some key deliverables. These deliverables may include:

- **Field Test Scope document –** This document will initiate the discussion with all relevant parties regarding project scope, facilitate in finalizing the Field Test scope and tactical project tasks, address risks/ issues that might impact the ICNCP Field Test and allow a discussion regarding next steps. Shown below is an example of a Scope document that can be generated for the ICNCP Field Test



Intelligent Cargo and Intelligent Network Port Logistics Chain Project (ICNCP)

To-Be Logistics Chain Detailed Scope Document

Document Purpose

1. Initiate discussion with Secretaria Especial de Portos regarding ICNCP project – Phase 2 scope
2. Finalize ICNCP project – Phase 2 scope and tactical project tasks
3. Discuss risks/ issues that might impact the Phase 2 of the ICNCP project
4. Discuss next steps

Introduction

The Phase 2 – To-Be Logistics Chain Detailed Scope document defines the focus of the Unisys Team phase tasks and will form the basis of the development of the To-Be solution for the Secretaria Especial de Portos (SEP) under the grant from the US Trade and Development Agency (USTDA).

The objective of Phase 2 of the ICNCP project is to:

- Profile & Evaluate cargo monitoring mechanisms
- Identify intelligent cargo & logistics networks best practices
- Define To-Be port logistics chain
- Determine benefits of To-Be port logistics chain
- Identify barriers to implementation from supply chain partners

Goal

As per the guidance from the Secretaria Especial de Portos (SEP), the goal of the ICNCP project To-Be Solution is the initial high level development of an information broker to share date across the six initial agencies of Sistema Porto Sem Papel.

Logistics Chain Scope

Based on discussions with SEP, the table below outlines the logistics chain the Unisys Team will focus on in the development of a To-Be solution for the ICNCP project.

No.	Supply Chain Type	Supply Chain Details	Cargo Type	Project Scope	
				Start	End
1.	Export	Supply Chain originating in Brasil with cargo destined to the U.S.	Containerized Cargo	Booking of Cargo containers	Cargo Discharge & Export Declaration (DE)

Approach & Deliverables

The Unisys Team will focus on the long course Export Logistics Chain and define the To-Be Logistics Chain by:

- Documenting container based technology solutions
- Identifying new and modified processes that enhance cargo visibility and security
- Enhancing overall information sharing capabilities to logistics chain participants

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Intelligent Cargo and Intelligent Network Port Logistics Chain Project (ICNCP) | Deliverables

Listed below are the tasks and the focus areas within each task of the Unisys Team approach for Phase 2 of the ICNCP project.

Task 1 - Confirm Logistics Chain

No.	Focus Area	Details
1.	Tasks	The Unisys Team will work with SEP to finalize the logistics chain to focus on in Phase 2 and develop the To-Be solution.
2.	Scope	The Unisys Team will focus on the Export Logistics Chain

Task 2 - Finalize Requirements

No.	Focus Area	Details
1.	Tasks	The Unisys Team will list out the requirements that need to be addressed by the To-Be Solution focused on the log course export logistics chain.
2.	Scope	The Unisys Team will focus on: • Technology enhancements • Best Practices based Process Improvements • Information sharing protocols and solutions

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Figure – Project Scope document

- **Kick-Off Presentation** – This document will be used by the ICNCP Field Test team to initiate the project with the relevant parties and discuss project timeline, tasks, roles and responsibilities and next steps. Shown below is an example of a Kick-Off presentation that can be generated for the ICNCP Field Test.

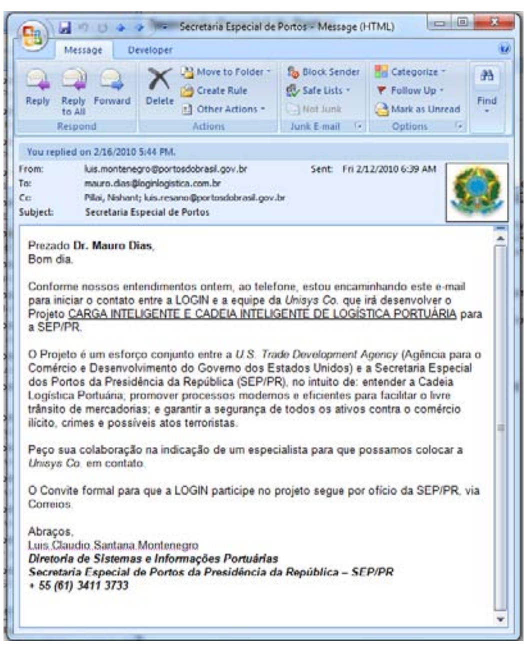
Figure – Kick-Off Presentation

- **Thirty (30) day project calendar** – This document will help in communicating the critical path tasks to be accomplished to make the ICNCP Field Test successful. Shown below is an example of a thirty (30) day project calendar that can be generated for the ICNCP Field Test

ICNCP – Fase 1 - Calendário de Execução						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
February 22	23	24	25	26	27	28
Grupo Curimbaba Reunião de "As – Is Discovery"		Projeto ICNCP Início e Workshop	Documentação de "As – Is Discovery" Documentação sobre os sistemas atuais	Documentação de "As – Is Discovery" Documentação sobre os sistemas atuais		
March 1	2	3	4	5	6	7
Manhã - Logística Grupo Curimbaba Tarde – Terminal de Conteineres Vazios Entrevistas e Vistoria	Manhã – Transportadora Alcace Tarde – HIPERCON Entrevista e Vistoria	BASF S.A. Reunião de "As – Is Discovery"	Manhã – Santos Brasil Tarde – Grupo CSAV Entrevista e Vistoria	Documentação e parecer sobre "As – Is Discovery"	Manhã – Grupo Curimbaba (Poço de Caldas) Tarde - Grupo Curimbaba (Poço de Caldas)	Documentação e parecer sobre "As – Is Discovery"
8	9	10	11	12	13	14
Manhã – Grupo Indaiá Tarde – Hamburg Süd Entrevistas e Vistoria	Manhã – Essemaga Tarde – Libra T37 Entrevistas e Vistoria	Manhã – Mesquita o BASF Demarchi Entrevista e Vistoria	Manhã – Grupo CSAV Tarde - Santos Brasil Entrevista e Vistoria	Documentação e parecer sobre "As – Is Discovery"	Documentação e parecer sobre "As – Is Discovery"	Manhã – LogIN – Vitoria (TVV)
15	16	17	18	19	20	21
"As – Is Discovery" Revisão e finalização da documentação	"As – Is Discovery" Revisão e finalização da documentação	Relatório Nro. 1 Revisão e Finalização da Seção	Relatório Nro. 1 Revisão e Finalização da Seção	Relatório Nro. 1 Revisão e Finalização da Seção	Documentação e parecer sobre "As – Is Discovery"	Documentação e parecer sobre "As – Is Discovery"
22	23	24	25	26	27	28
Relatório Nro. 1 Revisão e Finalização da Seção	Relatório Nro. 1 Revisão e Finalização da Seção	Relatório Nro. 1 Produção, Preparação da Reunião de Fechamento	Relatório Nro. 1 Apresentação Executiva	Relatório Nro. 1 Encerramento e Entrega		

Figure – Thirty (30) Project Calendar

- **Invitation and confirmation of participation of logistics chain stakeholders –** This documentation will allow SEP to invite and bring on board the relevant parties to participate in the ICNCP Field Test. Shown below is an example of the Project Invitation and Participation communication that can be generated for the ICNCP Field Test.



Secretaria Especial de Portos - Message (HTML)

You replied on 2/16/2010 5:44 PM.

From: luis.montenegro@portosdobrasil.gov.br Sent: Fri 2/12/2010 6:39 AM
To: mauro.dias@loginlogistica.com.br
Cc: Pillai, Nishant; luis.resano@portosdobrasil.gov.br
Subject: Secretaria Especial de Portos

Prezado **Dr. Mauro Dias**,
Bom dia.

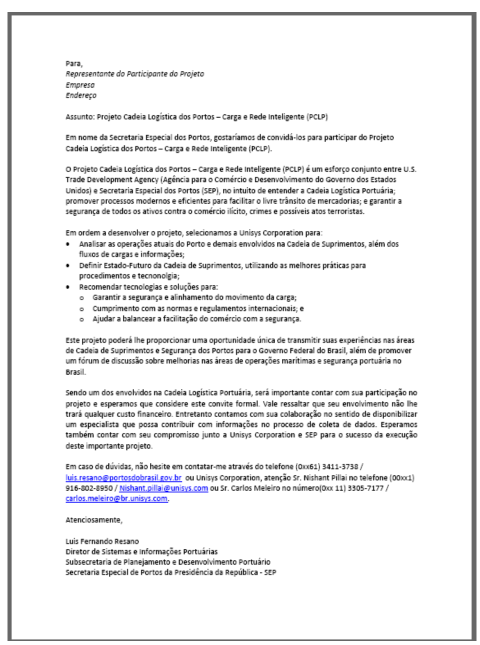
Conforme nossos entendimentos ontem, ao telefone, estou encaminhando este e-mail para iniciar o contato entre a LOGIN e a equipe da *Unisys Co.* que irá desenvolver o Projeto CARGA INTELIGENTE E CADEIA INTELIGENTE DE LOGÍSTICA PORTUÁRIA para a SEP/PR.

O Projeto é um esforço conjunto entre a *U.S. Trade Development Agency* (Agência para o Comércio e Desenvolvimento do Governo dos Estados Unidos) e a Secretaria Especial dos Portos da Presidência da República (SEP/PR), no intuito de: entender a Cadeia Logística Portuária; promover processos modernos e eficientes para facilitar o livre trânsito de mercadorias; e garantir a segurança de todos os ativos contra o comércio ilícito, crimes e possíveis atos terroristas.

Peço sua colaboração na indicação de um especialista para que possamos colocar a *Unisys Co.* em contato.

O Convite formal para que a LOGIN participe no projeto segue por ofício da SEP/PR, via Correios.

Abraços,
Luis Claudio Santana Montenegro
Diretoria de Sistemas e Informações Portuárias
Secretaria Especial de Portos da Presidência da República – SEP/PR
+ 55 (61) 3411 3733



Para,
Representante do Participante do Projeto
Empresa
Endereço

Assunto: Projeto Cadeia Logística dos Portos – Carga e Rede Inteligente (PCLP)

Em nome da Secretaria Especial dos Portos, gostaríamos de convidá-los para participar do Projeto Cadeia Logística dos Portos – Carga e Rede Inteligente (PCLP).

O Projeto Cadeia Logística dos Portos – Carga e Rede Inteligente (PCLP) é um esforço conjunto entre U.S. Trade Development Agency (Agência para o Comércio e Desenvolvimento do Governo dos Estados Unidos) e Secretaria Especial dos Portos (SEP), no intuito de entender a Cadeia Logística Portuária; promover processos modernos e eficientes para facilitar o livre trânsito de mercadorias; e garantir a segurança de todos os ativos contra o comércio ilícito, crimes e possíveis atos terroristas.

Em ordem a desenvolver o projeto, selecionamos a Unisys Corporation para:

- Analisar as operações atuais do Porto e demais envolvidos na Cadeia de Suprimentos, além dos fluxos de cargas e informações;
- Definir Estado-Futuro da Cadeia de Suprimentos, utilizando as melhores práticas para procedimentos e tecnonolgia;
- Recomendar tecnologias e soluções para:
  - Garantir a segurança e alinhamento do movimento da carga;
  - Cumprimento com as normas e regulamentos internacionais; e
  - Ajudar a balancear a facilitação do comércio com a segurança.

Este projeto poderá lhe proporcionar uma oportunidade única de transmitir suas experiências nas áreas de Cadeia de Suprimentos e Segurança dos Portos para o Governo Federal do Brasil, além de promover um fórum de discussão sobre melhorias nas áreas de operações marítimas e segurança portuária no Brasil.

Sendo um dos envolvidos na Cadeia Logística Portuária, será importante contar com sua participação no projeto e esperamos que considere este convite formal. Vale ressaltar que seu envolvimento não lhe trará qualquer custo financeiro. Entretanto contamos com sua colaboração no sentido de disponibilizar um especialista que possa contribuir com informações no processo de coleta de dados. Esperamos também contar com seu compromisso junto a Unisys Corporation e SEP para o sucesso da execução deste importante projeto.

Em caso de dúvidas, não hesite em contatar-me através do telefone (0xx61) 3411-3738 / luis.resano@portosdobrasil.gov.br ou Unisys Corporation, atenção Sr. Nishant Pillai no telefone (00xx1) 916-802-8950 / Nishant.pillai@unisys.com ou Sr. Carlos Meleiro no número(0xx 11) 3305-7177 / carlos.meleiro@br.unisys.com.

Atenciosamente,

Luis Fernando Resano
Diretor de Sistemas e Informações Portuárias
Subsecretaria de Planejamento e Desenvolvimento Portuário
Secretaria Especial de Portos da Presidência da República - SEP

Figure – Project Participation Communication

- **High Level Project Timeline -** This document will allow the ICNCP Field Test team to communicate the overall project timeline to the relevant parties, acquire feedback and adjust the overall project schedule. Shown below is an example of a High Level Project Timeline that can be generated for the ICNCP Field Test.

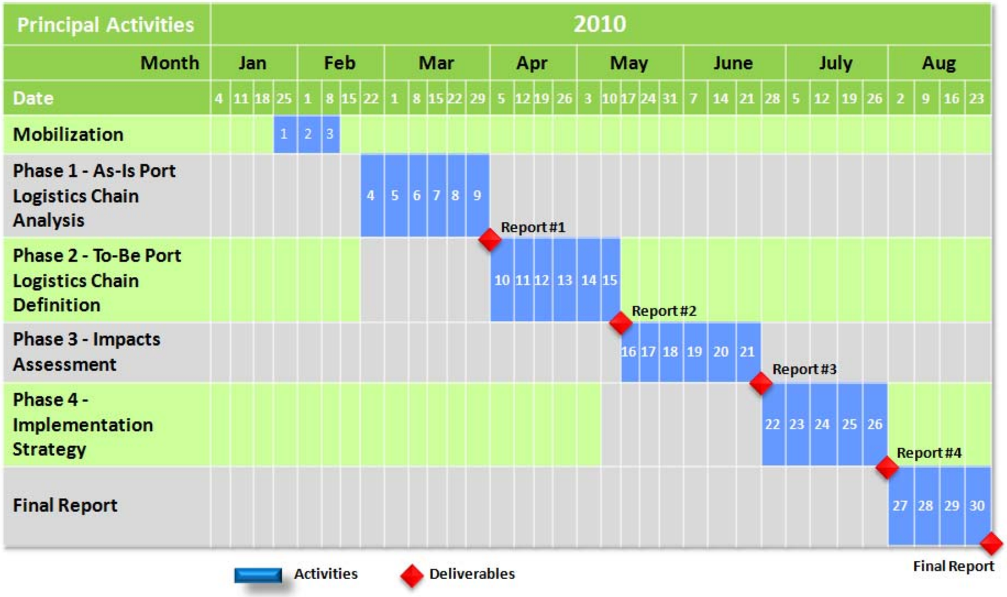


Figure – High Level Project Timeline

- **Project Execution Plan –** This document developed in Microsoft Project will list all the major tasks involved in the execution of the ICNCP Field Test including resource requirements and high level timeframes. Shown below is an example of the Project Execution Plan that can be generated for the ICNCP Field Test

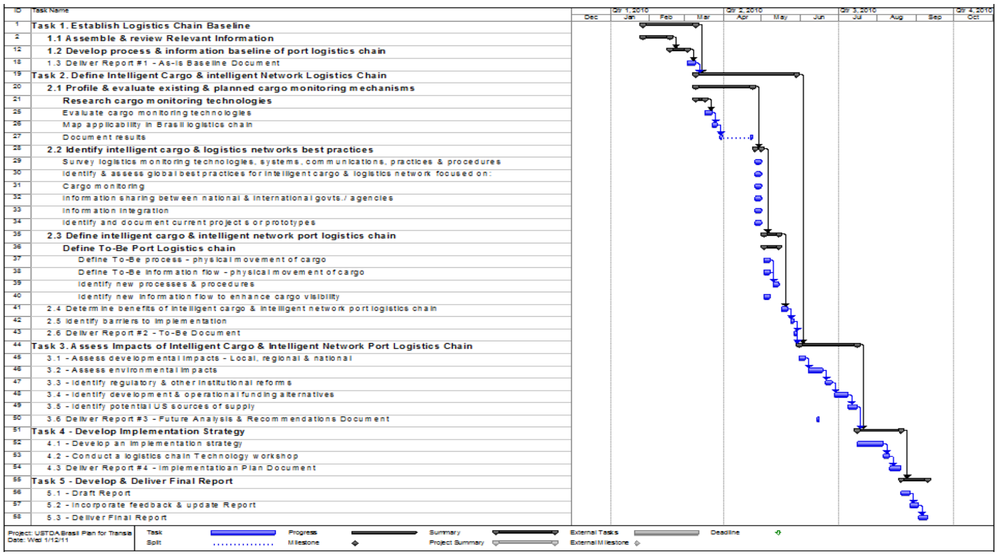
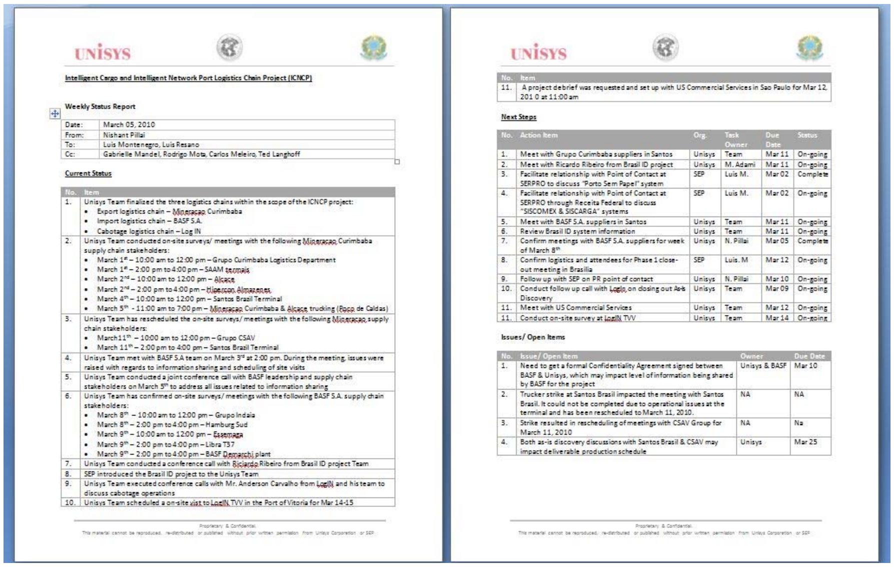


Figure – Project Execution Plan

- **Weekly status reports –** This document will provide a tool for the project manager to communicate overall status, issues and resolutions to all relevant parties involved in the

ICNCP Field Test. Shown below is an example of the Weekly Status Report that can be generated for the ICNCP Field Test



Intelligent Cargo and Intelligent Network Port Logistics Chain Project (ICNCP)

Weekly Status Report

Date:	March 05, 2010
From:	Nishant Pillai
To:	Luis Montenegro, Luis Resano
Cc:	Gabrielle Mandel, Rodrigo Mota, Carlos Meleiro, Ted Langhoff

Current Status

No.	Item
1.	Unisys Team finalized the three logistics chains within the scope of the ICNCP project: • Export logistics chain – Mineracao Curimbaba • Import logistics chain – BASF S.A. • Cabotage logistics chain – Log IN
2.	Unisys Team conducted on-site surveys/ meetings with the following Mineracao Curimbaba supply chain stakeholders: • March 1st – 10:00 am to 12:00 pm – Grupo Curimbaba Logistics Department • March 1st – 2:00 pm to 4:00 pm – SAAM termais • March 2nd – 10:00 am to 12:00 pm – Alcace • March 2nd – 2:00 pm to 4:00 pm – Hipercon Almazenes • March 4th – 10:00 am to 12:00 pm – Santos Brazil Terminal • March 5th - 11:00 am to 7:00 pm – Mineracao Curimbaba & Alcace trucking (Poco de Caldas)
3.	Unisys Team has rescheduled the on-site surveys/ meetings with the following Mineracao supply chain stakeholders: • March11th – 10:00 am to 12:00 pm – Grupo CSAV • March 11th – 2:00 pm to 4:00 pm – Santos Brazil Terminal
4.	Unisys Team met with BASF S.A team on March 3rd at 2:00 pm. During the meeting, issues were raised with regards to information sharing and scheduling of site visits
5.	Unisys Team conducted a joint conference call with BASF leadership and supply chain stakeholders on March 5th to address all issues related to information sharing
6.	Unisys Team has confirmed on-site surveys/ meetings with the following BASF S.A. supply chain stakeholders: • March 8th – 10:00 am to 12:00 pm – Grupo Indaia • March 8th – 2:00 pm to 4:00 pm – Hamburg Sud • March 9th – 10:00 am to 12:00 pm – Essemaga • March 9th – 2:00 pm to 4:00 pm – Libra T37 • March 9th – 2:00 pm to 4:00 pm – BASF Demarchi plant
7.	Unisys Team conducted a conference call with Riciardo Ribeiro from Brasil ID project Team
8.	SEP introduced the Brasil ID project to the Unisys Team
9.	Unisys Team executed conference calls with Mr. Anderson Carvalho from LogIN and his team to discuss cabotage operations
10.	Unisys Team scheduled a on-site vist to LogIN TVV in the Port of Vitoria for Mar 14-15

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No.	Item
11.	A project debrief was requested and set up with US Commercial Services in Sao Paulo for Mar 12, 201 0 at 11:00 am

Next Steps

No.	Action Item	Org.	Task Owner	Due Date	Status
1.	Meet with Grupo Curimbaba suppliers in Santos	Unisys	Team	Mar 11	On-going
2.	Meet with Ricardo Ribeiro from Brasil ID project	Unisys	M. Adami	Mar 11	On-going
3.	Facilitate relationship with Point of Contact at SERPRO to discuss "Porto Sem Papel" system	SEP	Luis M.	Mar 02	Complete
4.	Facilitate relationship with Point of Contact at SERPRO through Receita Federal to discuss "SISCOMEX & SISCARGA" systems	SEP	Luis M.	Mar 02	On-going
5.	Meet with BASF S.A. suppliers in Santos	Unisys	Team	Mar 11	On-going
6.	Review Brasil ID system information	Unisys	Team	Mar 11	On-going
7.	Confirm meetings with BASF S.A. suppliers for week of March 8th	Unisys	N. Pillai	Mar 05	Complete
8.	Confirm logistics and attendees for Phase 1 close-out meeting in Brasilia	SEP	Luis. M	Mar 12	On-going
9.	Follow up with SEP on PR point of contact	Unisys	N. Pillai	Mar 10	On-going
10.	Conduct follow up call with LogIn on closing out As-Is Discovery	Unisys	Team	Mar 09	On-going
11.	Meet with US Commercial Services	Unisys	Team	Mar 12	On-going
11.	Conduct on-site survey at LogIN TVV	Unisys	Team	Mar 14	On-going

Issues/ Open Items

No.	Issue/ Open Item	Owner	Due Date
1.	Need to get a formal Confidentiality Agreement signed between BASF & Unisys, which may impact level of information being shared by BASF for the project	Unisys & BASF	Mar 10
2.	Trucker strike at Santos Brasil impacted the meeting with Santos Brasil. It could not be completed due to operational issues at the terminal and has been rescheduled to March 11, 2010.	NA	NA
3.	Strike resulted in rescheduling of meetings with CSAV Group for March 11, 2010	NA	Na
4.	Both as-is discovery discussions with Santos Brasil & CSAV may impact deliverable production schedule	Unisys	Mar 25

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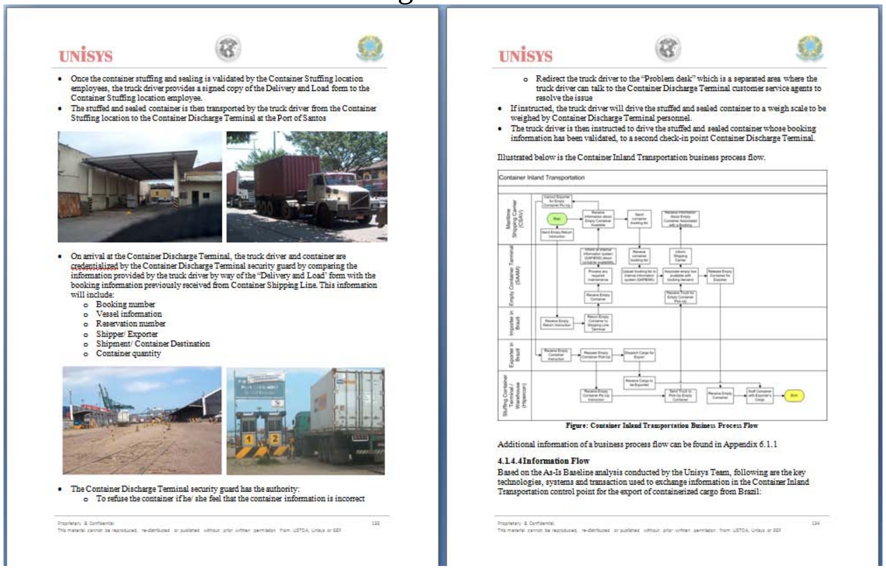
Figure – Weekly Status Report

Phase II – Gap Analysis

The tasks performed by the Field Test team during the Gap Analysis phase will lead to the generation of some key deliverables. These deliverables may include:

- **Logistics Chain Baseline Business Processes -** This deliverable will help the Field Test team document the current detailed level port and logistics chain operations. It was also provide a tool for the Field Test team to conduct the gap analysis and they will be able to compare and contrast the information collected with the information documented during the ICNCP feasibility study. Shown below is an example of the Logistics Chain Baseline Business Processes document that can be generated for the ICNCP Field Test



- Once the container stuffing and sealing is validated by the Container Stuffing location employees, the truck driver provides a signed copy of the Delivery and Load form to the Container Stuffing location employee.
- The stuffed and sealed container is then transported by the truck driver from the Container Stuffing location to the Container Discharge Terminal at the Port of Santos
- On arrival at the Container Discharge Terminal, the truck driver and container are credentialized by the Container Discharge Terminal security guard by comparing the information provided by the truck driver by way of the "Delivery and Load' form with the booking information previously received from Container Shipping Line. This information will include:
  - Booking number
  - Vessel information
  - Reservation number
  - Shipper/ Exporter
  - Shipment/ Container Destination
  - Container quantity
- The Container Discharge Terminal security guard has the authority:
  - To refuse the container if he/ she feel that the container information is incorrect

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- Redirect the truck driver to the "Problem desk" which is a separated area where the truck driver can talk to the Container Discharge Terminal customer service agents to resolve the issue
- If instructed, the truck driver will drive the stuffed and sealed container to a weigh scale to be weighed by Container Discharge Terminal personnel.
- The truck driver is then instructed to drive the stuffed and sealed container whose booking information has been validated, to a second check-in point Container Discharge Terminal.

Illustrated below is the Container Inland Transportation business process flow.

Figure: Container Inland Transportation Business Process Flow

Additional information of a business process flow can be found in Appendix 6.1.1

4.1.4.4 Information Flow

Based on the As-Is Baseline analysis conducted by the Unisys Team, following are the key technologies, systems and transaction used to exchange information in the Container Inland Transportation control point for the export of containerized cargo from Brazil:

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Figure – Logistics Chain Baseline Business Processes

- **Gap Analysis Document –** This document will be the basis of the effort conducted by the Field Test team to compare the ICNCP feasibility study results with the current logistics chain processes, systems, documentation and information related to the Sistema Porto Sem Papel. Shown below is an example of a Gap Analysis Document that can be generated for the ICNCP Field Test

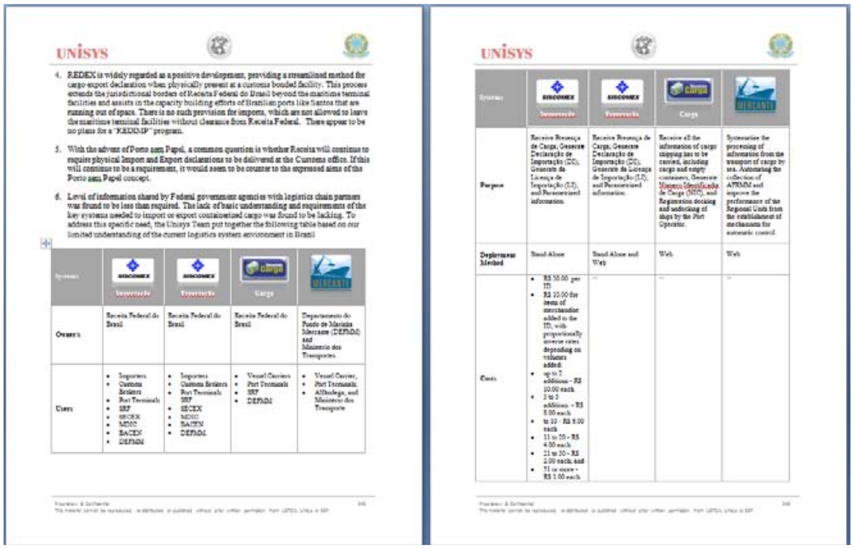


Figure – Gap Analysis Document

- **Gap Analysis Presentation –** This document will be used by the ICNCP Field Test team to present the results of the Gap Analysis effort comparing the results of the ICNCP feasibility study with the current logistics chain processes, systems, documentation and information related to the Sistema Porto Sem Papel. Shown below is an example of a Gap Analysis Presentation that can be generated for the ICNCP Field Test

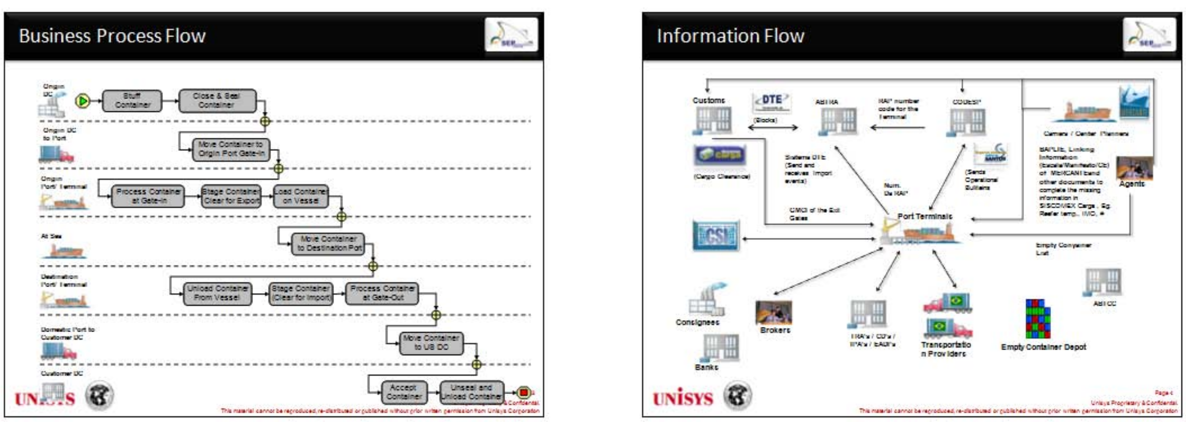


Figure – Gap Analysis Presentation

- **Weekly status reports –** This document will provide a tool for the project manager to communicate overall status, issues and resolutions to all relevant parties involved in the ICNCP Field Test. Shown below is an example of the Weekly Status Report that can be generated for the ICNCP Field Test

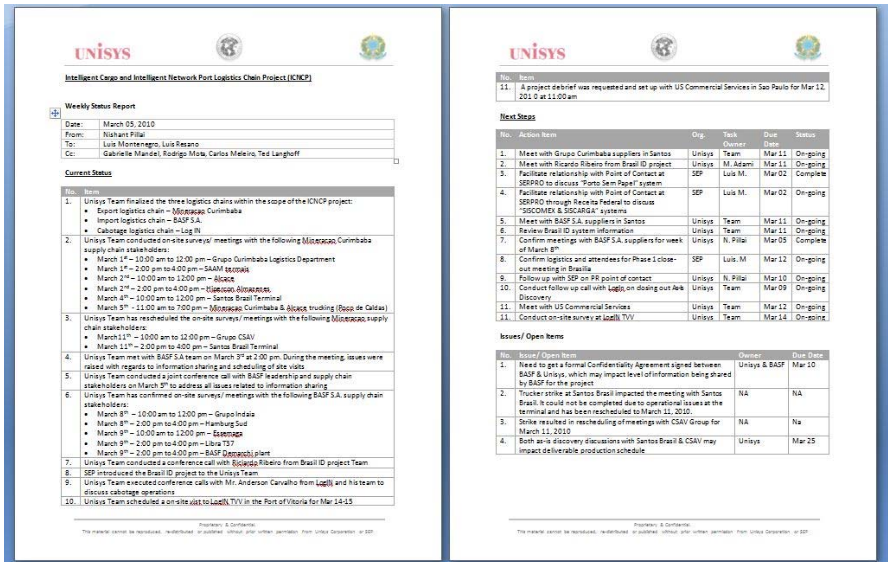


Figure – Weekly Status Report

Phase III – Detailed Solution Design

The tasks performed by the Field Test team during the Detailed Solution Design phase will lead to the generation of some key deliverables. These deliverables may include:

- **ICNCP Field Test Requirements -** This deliverable will help the Field Test team document the detailed functional and technical requirements for the ICNCP Field Test. This document will identify the required changes to the ICNCP high level design, identify and verify the ICNCP Field Test solution components, hardware and the wireless communication requirements and applications, technologies and hardware required to implement and execute the ICNCP Field Test. Shown below is an example a Field Test Requirements document that can be generated for the ICNCP Field Test.

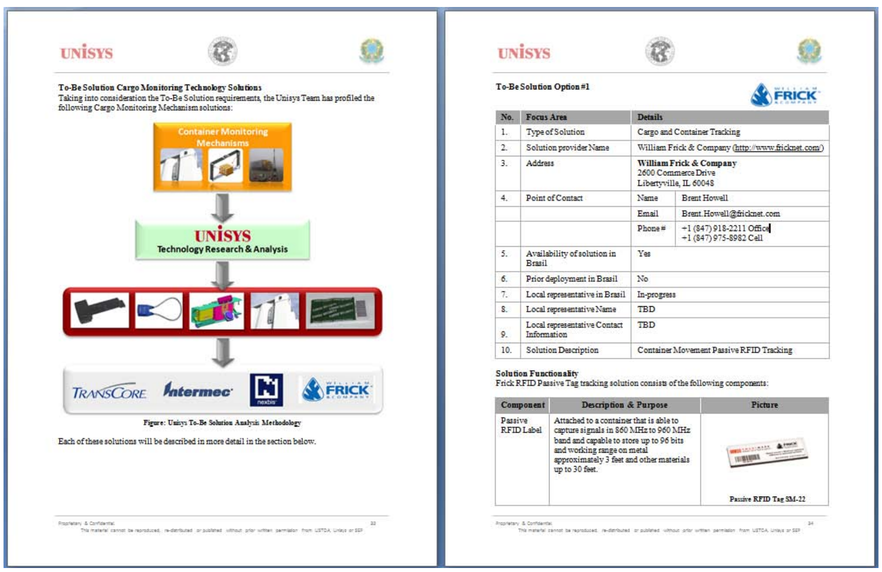


Figure – Field Test Requirements document

- **ICNCP Field Test Detailed Design document –** This deliverable will help the Field Test team document the To-Be business process, information flows identifying all systems which will be integrated, documentation flows, interface and data schemas and the structure of interfaces that will allow free information exchange between each system within the ICNCP Field Test. This document with also document the solution components and integration platforms and middleware for RFID readers. Shown below is an example of a Detailed Design document that can be generated for the ICNCP Field Test

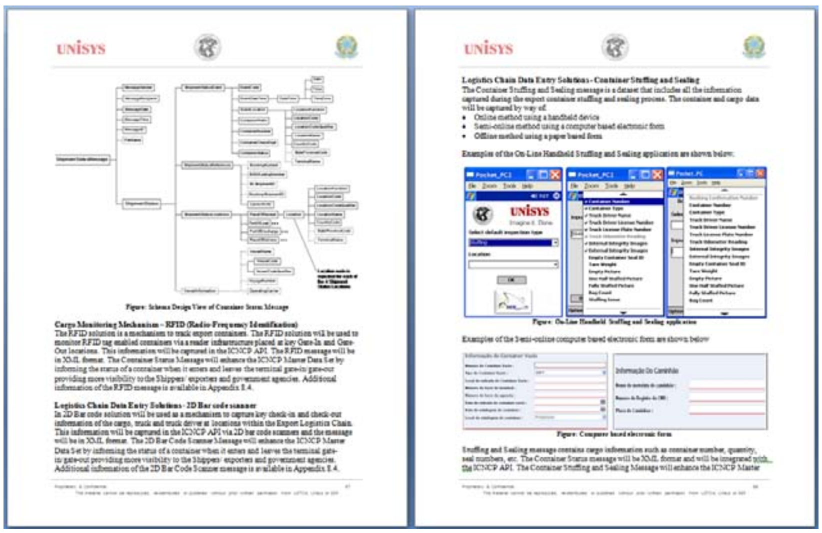


Figure – Detailed Design document

- **Field Test Bill of Materials –** This deliverable will be created by the Field Test team to document costs for each logistics chain including hardware such as container monitoring mechanisms, readers, devices, spares and buffer stock, software to support the deployment of the different technology solutions and the services needed to execute the development, deployment and execution of the solutions. Shown below is an example of a Bill of Material document that can be generated for the ICNCP Field Test

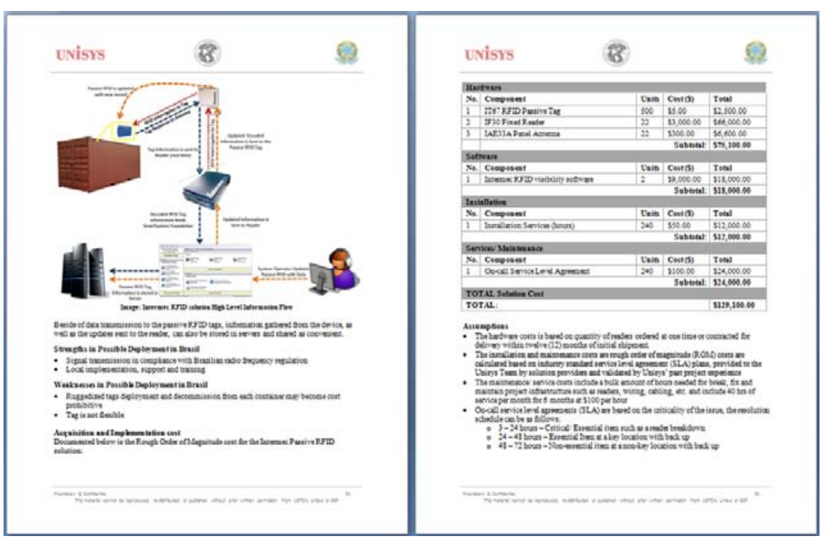
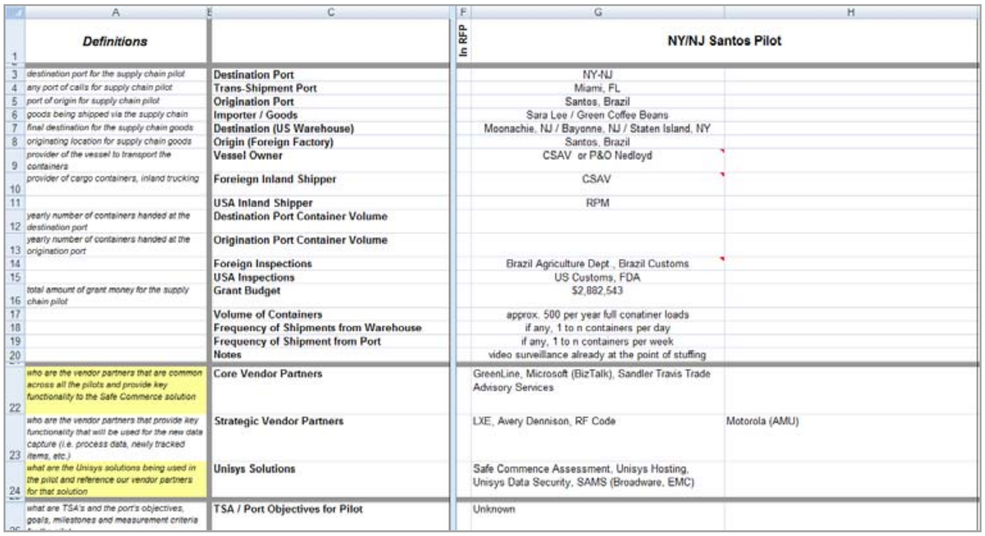


Figure – Bill of Materials

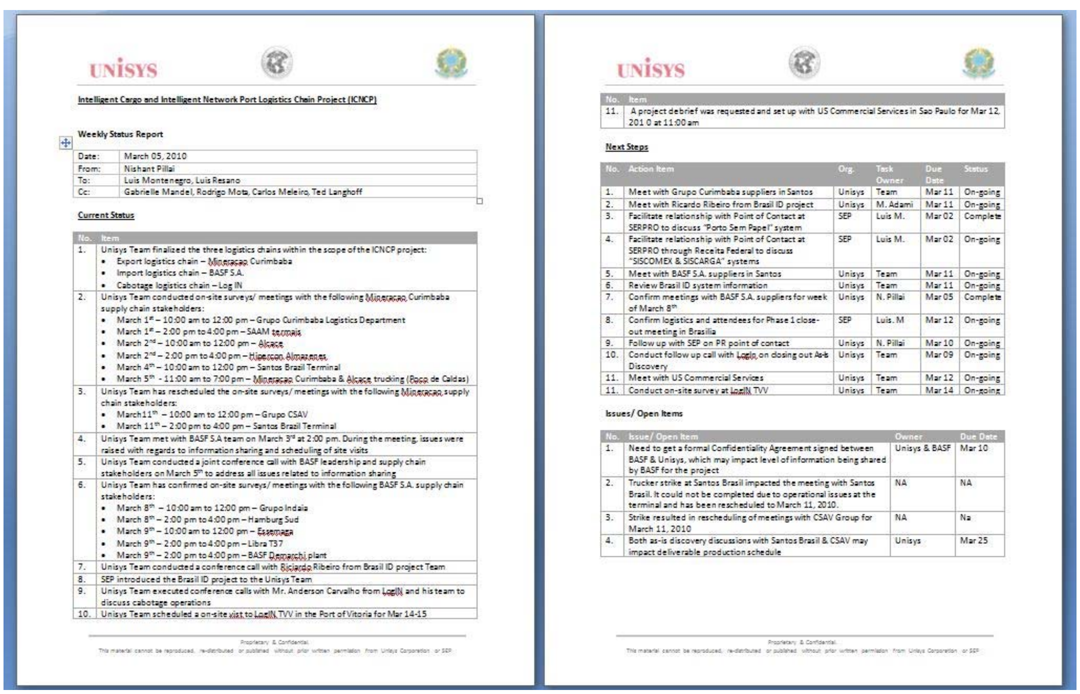
- **ICNCP Field Test Vendor Selection Tool -** This deliverable will help the Field Test team document the all the relevant vendors whose solutions will constitute the ICNCP Field Test solution. This document with also document the solution components and integration platforms and middleware for RFID readers. Shown below is an example of a Vendor Selection Tool that can be generated for the ICNCP Field Test.



	A	C	F	G	H
1	*Definitions*		In RFP	**NY/NJ Santos Pilot**	
3	*destination port for the supply chain pilot*	**Destination Port**		NY-NJ	
4	*any port of calls for supply chain pilot*	**Trans-Shipment Port**		Miami, FL	
5	*port of origin for supply chain pilot*	**Origination Port**		Santos, Brazil	
6	*goods being shipped via the supply chain*	**Importer / Goods**		Sara Lee / Green Coffee Beans	
7	*final destination for the supply chain goods*	**Destination (US Warehouse)**		Moonachie, NJ / Bayonne, NJ / Staten Island, NY	
8	*originating location for supply chain goods*	**Origin (Foreign Factory)**		Santos, Brazil	
9	*provider of the vessel to transport the containers*	**Vessel Owner**		CSAV or P&O Nedloyd	
10	*provider of cargo containers, inland trucking*	**Foreiegn Inland Shipper**		CSAV	
11		**USA Inland Shipper**		RPM	
12	*yearly number of containers handed at the destination port*	**Destination Port Container Volume**			
13	*yearly number of containers handed at the origination port*	**Origination Port Container Volume**			
14		**Foreign Inspections**		Brazil Agriculture Dept., Brazil Customs	
15		**USA Inspections**		US Customs, FDA	
16	*total amount of grant money for the supply chain pilot*	**Grant Budget**		$2,882,543	
17		**Volume of Containers**		approx. 500 per year full conatiner loads	
18		**Frequency of Shipments from Warehouse**		if any, 1 to n containers per day	
19		**Frequency of Shipment from Port**		if any, 1 to n containers per week	
20		**Notes**		video surveillance already at the point of stuffing	
22	*who are the vendor partners that are common across all the pilots and provide key functionality to the Safe Commerce solution*	**Core Vendor Partners**		GreenLine, Microsoft (BizTalk), Sandler Travis Trade Advisory Services	
23	*who are the vendor partners that provide key functionality that will be used for the new data capture (i.e. process data, newly tracked items, etc.)*	**Strategic Vendor Partners**		LXE, Avery Dennison, RF Code	Motorola (AMU)
24	*what are the Unisys solutions being used in the pilot and reference our vendor partners for that solution*	**Unisys Solutions**		Safe Commence Assessment, Unisys Hosting, Unisys Data Security, SAMS (Broadware, EMC)	
26	*what are TSA's and the port's objectives, goals, milestones and measurement criteria*	**TSA / Port Objectives for Pilot**		Unknown	

Figure – Vendor Selection Tool

- **Weekly status reports –** This document will provide a tool for the project manager to communicate overall status, issues and resolutions to all relevant parties involved in the ICNCP Field Test. Shown below is an example of the Weekly Status Report that can be generated for the ICNCP Field Test.



UNISYS

Intelligent Cargo and Intelligent Network Port Logistics Chain Project (ICNCP)

Weekly Status Report

Date:	March 05, 2010
From:	Nishant Pillai
To:	Luis Montenegro, Luis Resano
Cc:	Gabrielle Mandel, Rodrigo Mota, Carlos Meleiro, Ted Langhoff

Current Status

No.	Item
1.	Unisys Team finalized the three logistics chains within the scope of the ICNCP project: • Export logistics chain – Mineracao Curimbaba • Import logistics chain – BASF S.A. • Cabotage logistics chain – Log IN
2.	Unisys Team conducted on-site surveys/ meetings with the following Mineracao Curimbaba supply chain stakeholders: • March 1st – 10:00 am to 12:00 pm – Grupo Curimbaba Logistics Department • March 1st – 2:00 pm to 4:00 pm – SAAM termais • March 2nd – 10:00 am to 12:00 pm – Alcace • March 2nd – 2:00 pm to 4:00 pm – Hipercon Almazenes • March 4th – 10:00 am to 12:00 pm – Santos Brazil Terminal • March 5th - 11:00 am to 7:00 pm – Mineracao Curimbaba & Alcace trucking (Poco de Caldas)
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4.	Unisys Team met with BASF S.A team on March 3rd at 2:00 pm. During the meeting, issues were raised with regards to information sharing and scheduling of site visits
5.	Unisys Team conducted a joint conference call with BASF leadership and supply chain stakeholders on March 5th to address all issues related to information sharing
6.	Unisys Team has confirmed on-site surveys/ meetings with the following BASF S.A. supply chain stakeholders: • March 8th – 10:00 am to 12:00 pm – Grupo Indaia • March 8th – 2:00 pm to 4:00 pm – Hamburg Sud • March 9th – 10:00 am to 12:00 pm – Essemaga • March 9th – 2:00 pm to 4:00 pm – Libra T37 • March 9th – 2:00 pm to 4:00 pm – BASF Demarchi plant
7.	Unisys Team conducted a conference call with Riciardo Ribeiro from Brasil ID project Team
8.	SEP introduced the Brasil ID project to the Unisys Team
9.	Unisys Team executed conference calls with Mr. Anderson Carvalho from LogIN and his team to discuss cabotage operations
10.	Unisys Team scheduled a on-site vist to LogIN TVV in the Port of Vitoria for Mar 14-15

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UNISYS

No.	Item
11.	A project debrief was requested and set up with US Commercial Services in Sao Paulo for Mar 12, 201 0 at 11:00 am

Next Steps

No.	Action Item	Org.	Task Owner	Due Date	Status
1.	Meet with Grupo Curimbaba suppliers in Santos	Unisys	Team	Mar 11	On-going
2.	Meet with Ricardo Ribeiro from Brasil ID project	Unisys	M. Adami	Mar 11	On-going
3.	Facilitate relationship with Point of Contact at SERPRO to discuss "Porto Sem Papel" system	SEP	Luis M.	Mar 02	Complete
4.	Facilitate relationship with Point of Contact at SERPRO through Receita Federal to discuss "SISCOMEX & SISCARGA" systems	SEP	Luis M.	Mar 02	On-going
5.	Meet with BASF S.A. suppliers in Santos	Unisys	Team	Mar 11	On-going
6.	Review Brasil ID system information	Unisys	Team	Mar 11	On-going
7.	Confirm meetings with BASF S.A. suppliers for week of March 8th	Unisys	N. Pillai	Mar 05	Complete
8.	Confirm logistics and attendees for Phase 1 close-out meeting in Brasilia	SEP	Luis. M	Mar 12	On-going
9.	Follow up with SEP on PR point of contact	Unisys	N. Pillai	Mar 10	On-going
10.	Conduct follow up call with LogIn on closing out As-is Discovery	Unisys	Team	Mar 09	On-going
11.	Meet with US Commercial Services	Unisys	Team	Mar 12	On-going
11.	Conduct on-site survey at LogIN TVV	Unisys	Team	Mar 14	On-going

Issues/ Open Items

No.	Issue/ Open Item	Owner	Due Date
1.	Need to get a formal Confidentiality Agreement signed between BASF & Unisys, which may impact level of information being shared by BASF for the project	Unisys & BASF	Mar 10
2.	Trucker strike at Santos Brasil impacted the meeting with Santos Brasil. It could not be completed due to operational issues at the terminal and has been rescheduled to March 11, 2010.	NA	NA
3.	Strike resulted in rescheduling of meetings with CSAV Group for March 11, 2010	NA	Na
4.	Both as-is discovery discussions with Santos Brasil & CSAV may impact deliverable production schedule	Unisys	Mar 25

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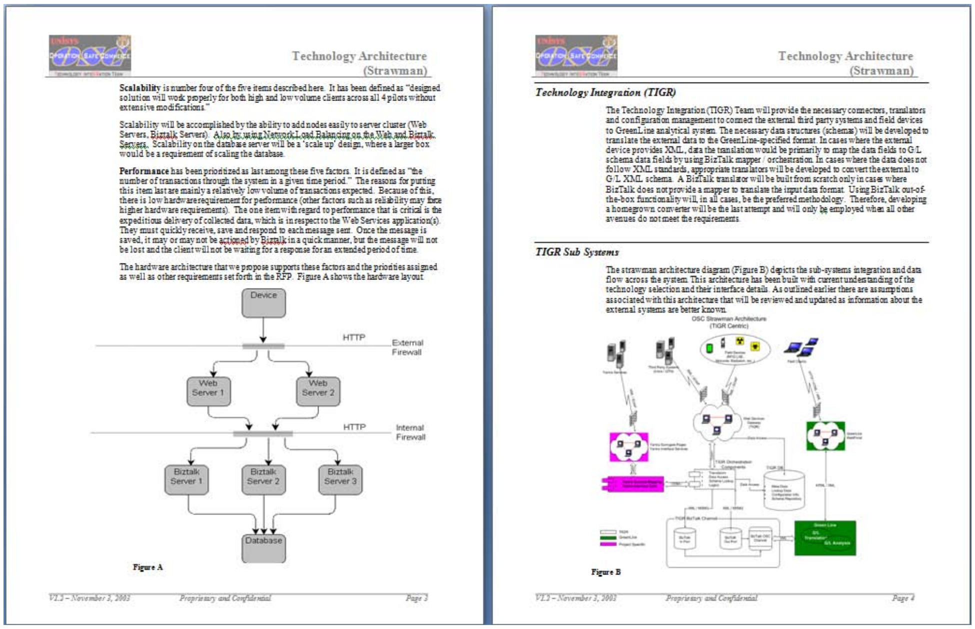
Figure – Weekly Status Report

Phase IV – Development and Deployment
The tasks performed by the Field Test team during the Development and Deployment phase will lead to the generation of some key deliverables. These deliverables may include:

- **Field Test Development Plan -** This deliverable will be created by the Field Test team to document the ICNCP Field Test development plan and will include solution development components such as software / middleware / applications, licenses, container monitoring mechanisms/ readers and devices. Shown below is an example of a Field Test Development Plan document that can be generated for the ICNCP Field Test


Technology Architecture (Strawman)

Scalability is number four of the five items described here. It has been defined as "designed solution will work properly for both high and low volume clients across all 4 pilots without extensive modifications."

Scalability will be accomplished by the ability to add nodes easily to server cluster (Web Servers, Biztalk Servers). Also by using Network Load Balancing on the Web and Biztalk Servers. Scalability on the database server will be a 'scale up' design, where a larger box would be a requirement of scaling the database.

Performance has been prioritized as last among these five factors. It is defined as "the number of transactions through the system in a given time period." The reasons for putting this item last are mainly a relatively low volume of transactions expected. Because of this, there is low hardware requirement for performance (other factors such as reliability may force higher hardware requirements). The one item with regard to performance that is critical is the expeditious delivery of collected data, which is in respect to the Web Services application(s). They must quickly receive, save and respond to each message sent. Once the message is saved, it may or may not be actioned by Biztalk in a quick manner, but the message will not be lost and the client will not be waiting for a response for an extended period of time.

The hardware architecture that we propose supports these factors and the priorities assigned as well as other requirements set forth in the RFP. Figure A shows the hardware layout.

Figure A

Technology Architecture (Strawman)

Technology Integration (TIGR)

The Technology Integration (TIGR) Team will provide the necessary connectors, translators and configuration management to connect the external third party systems and field devices to GreenLine analytical system. The necessary data structures (schemas) will be developed to translate the external data to the GreenLine-specified format. In cases where the external device provides XML, data the translation would be primarily to map the data fields to G/L schema data fields by using BizTalk mapper / orchestration. In cases where the data does not follow XML standards, appropriate translators will be developed to convert the external to G/L XML schema. A BizTalk translator will be built from scratch only in cases where BizTalk does not provide a mapper to translate the input data format. Using BizTalk out-of-the-box functionality will, in all cases, be the preferred methodology. Therefore, developing a homegrown converter will be the last attempt and will only be employed when all other avenues do not meet the requirements.

TIGR Sub Systems

The strawman architecture diagram (Figure B) depicts the sub-systems integration and data flow across the system. This architecture has been built with current understanding of the technology selection and their interface details. As outlined earlier there are assumptions associated with this architecture that will be reviewed and updated as information about the external systems are better known.

Figure B

Figure – Field Test Development Plan

- **Updated ICNCP Field Test Solution Design -** This deliverable will be updated by the Field Test team and will include installed and configured solution components, configured and tested software middleware and applications, IT interfaces, devices to/from data collection infrastructure, data collection infrastructure to/from the API, carrier and terminal operating systems interface, API to/from Sistema Porto Sem Papel and container monitoring mechanisms. This document with also document the solution components and integration platforms and middleware for RFID readers. Shown below is an example of a Solution Design document that can be generated for the ICNCP Field Test.

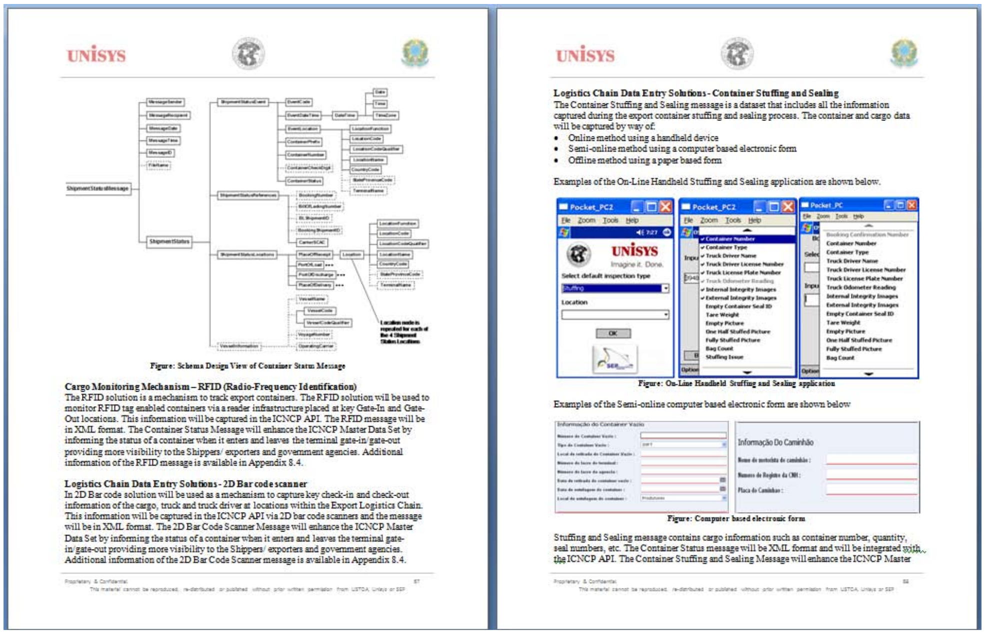


Figure – Detailed Design document

- **Testing Plan –** This deliverable will be created by the Field Test team to document the plan to test the ICNCP Field Test solution. This approach will focus on lab testing conducted at logistics chain stakeholder office locations and operational/ field testing conducted at the logistics chain control point locations and will include hardware bench testing, integration testing and acceptance testing. Shown below is an example of a Testing Plan document that can be generated for the ICNCP Field Test.

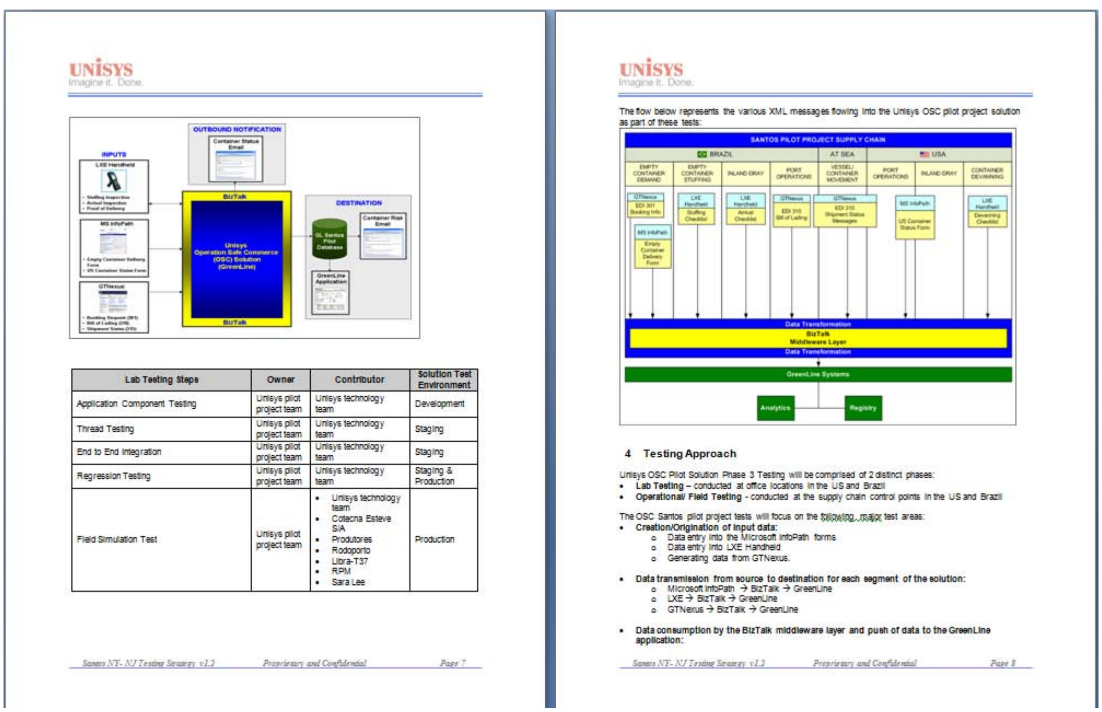


Figure – Testing Plan

- **Scenario Testing Document –** This deliverable will be created by the Field Test team to guide the personnel testing the ICNCP Field Test solution through multiple scenarios and test cases. This approach will include hardware bench testing, integration testing and acceptance testing. Shown below is an example of a Scenario Testing document that can be generated for the ICNCP Field Test.

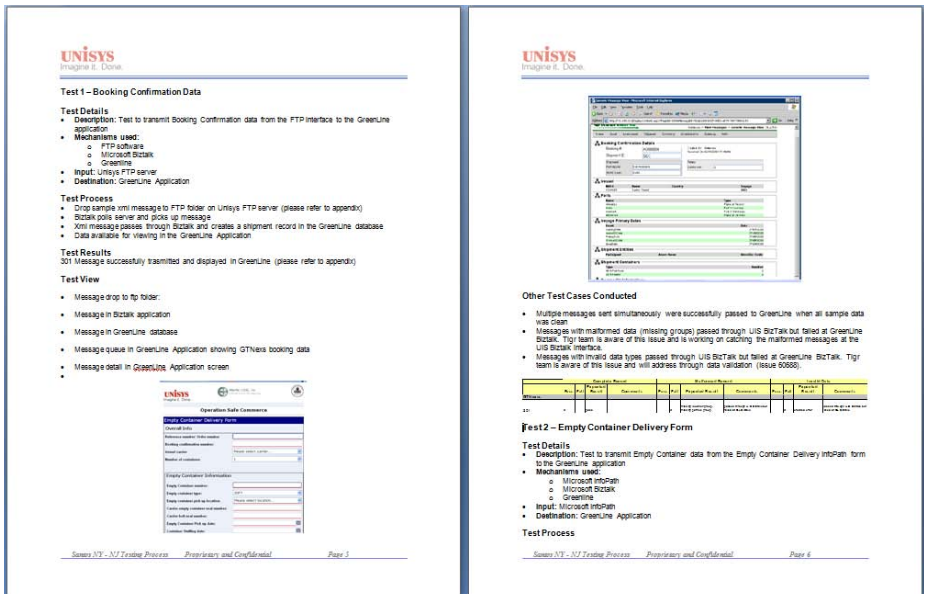


Figure – Scenario Testing document

- **Training Strategy –** This document will be created by the ICNCP Field Test team to document the overall training strategy for the Field Test and provide a tool to manage the training schedule and communication plan. Shown below is an example of a Training Strategy document that can be generated for the ICNCP Field Test.

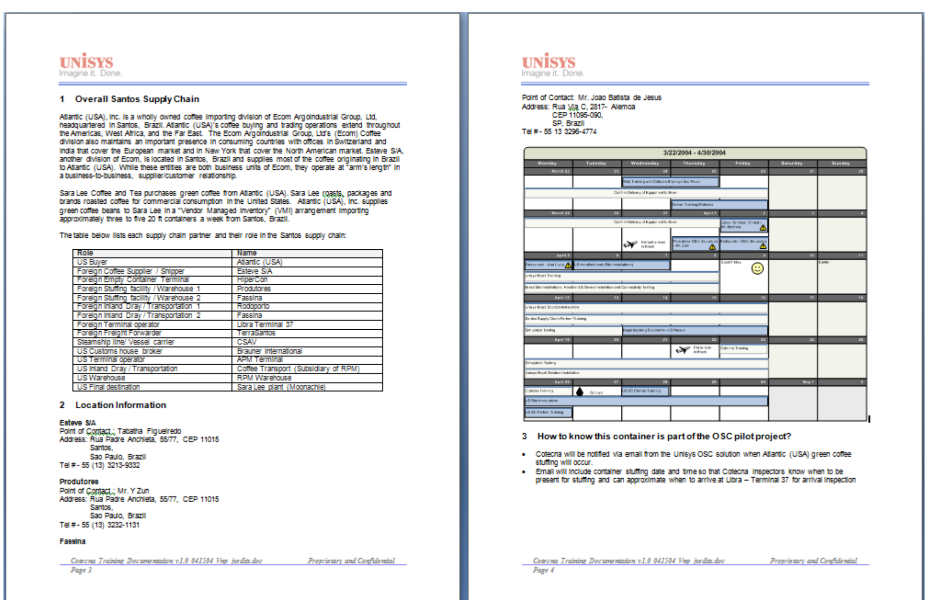


Figure – Training Strategy document

- **Stakeholder Training document** - This deliverable will be created by the Field Test team to train the logistics chain stakeholder personnel to use the ICNCP Field Test solution during the Field Test. This document will provide a step by step approach for the successful usage of all tools available to test the ICNCP Field Test solution. Shown below is an example of a Stakeholder Training document that can be generated for the ICNCP Field Test.

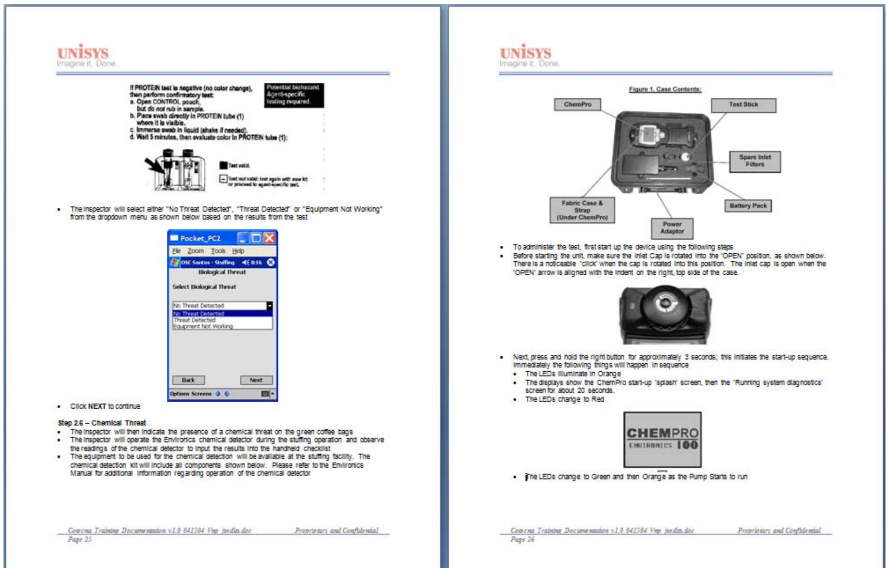


Figure – Stakeholder Training document

- **Weekly status reports –** This document will provide a tool for the project manager to communicate overall status, issues and resolutions to all relevant parties involved in the ICNCP Field Test. Shown below is an example of the Weekly Status Report that can be generated for the ICNCP Field Test.

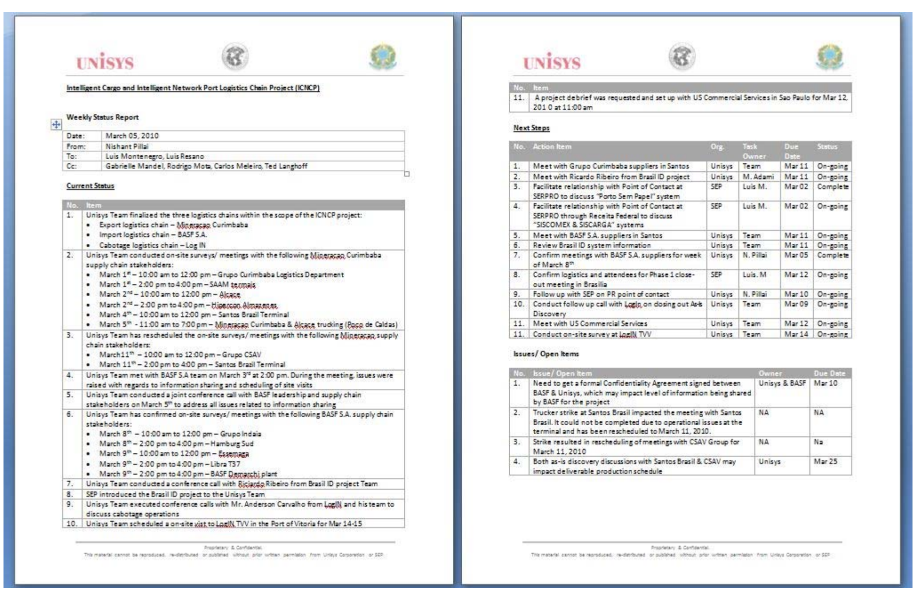


Figure – Weekly Status Report

Phase V – Field Test Execution
The tasks performed by the Field Test team during the Field Test Execution phase will lead to the generation of some key deliverables. These deliverables may include:

- **System Testing Document –** This deliverable will be created by the Field Test team to guide the technical team to test the overall Field Test solution through multiple test cases. This approach will include user login, volume/stress testing, integration and fail-over testing. Shown below is an example of a System Testing document that can be generated for the ICNCP Field Test.

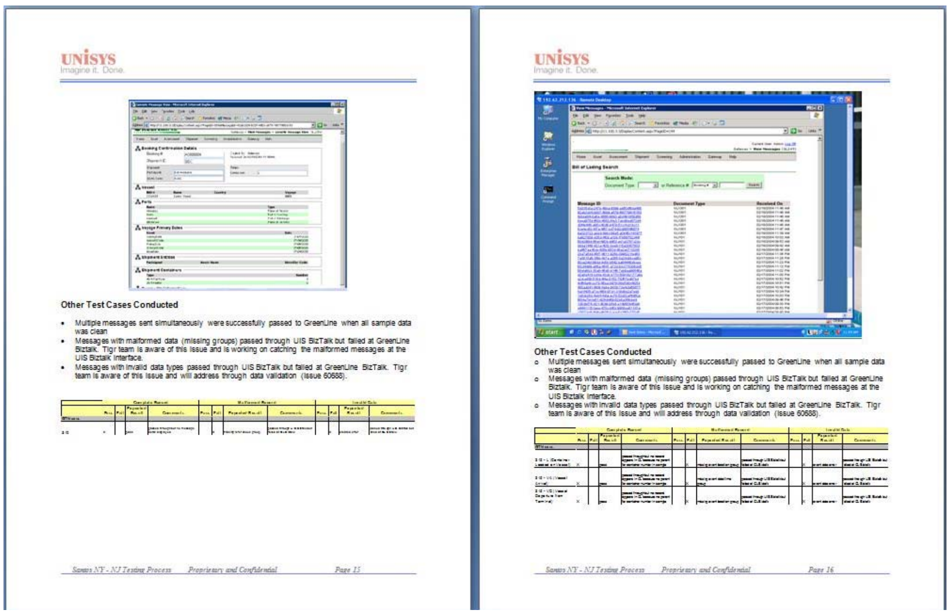


Figure – System Testing document

- **Go-Live Presentation –** This document will be used by the ICNCP Field Test team to communicate with the relevant parties and share with them details regarding the Field Test execution. Shown below is an example of a Go-Live presentation that can be generated for the ICNCP Field Test.

Figure – Go Live Presentation

- **Solution Performance and Shipment Report –** This document will be created by the ICNCP Field Test team to document the cargo volumes, read rates, system performance and interface analysis, system issues and resolution actions. Shown below is an example of the Solution Performance and Shipment Report that can be generated for the ICNCP Field Test.

	A	B	C	D	E	F
4		**Container Stuffing 1**	**Container Stuffing 2**	**Container Stuffing 3**	**Container Stuffing 4**	**Container Stuffing 5**
5						
6	**Unisys Observer**	Nishant Pillai	Nishant Pillai	Nishant Pillai	Nishant Pillai	Nishant Pillai
7	**Booking No.**	RSE0028409	RSE0028408	RSE0028408	RSE0028408	RSE0028408
8	**Container No.**	TTNU3835660	TTNU1409455	TTNU1418740	IPXU3147063	AMFU3052228
9	**Vessel Carrier**	Hamburg Sud	Hamburg Sud	Hamburg Sud	Hamburg Sud	Hamburg Sud
10	**Vessel Name**	Cap San Augustin	Cap San Augustin	Cap San Augustin	Cap San Augustin	Cap San Augustin
11	**Stuffing Location**	Fassina Guaruja	Fassina Guaruja	Fassina Guaruja	Fassina Guaruja	Fassina Guaruja
12	**Start Date (dd:mm)**	7-May	7-May	7-May	7-May	7-May
13	**Expected Start Time**	9:30	9:30	9:30	9:30	9:30
14	**Start Time (hh:mm)**	10:00	10:55	14:00	14:55	15:50
15	**Cotecna Agent Name**	Decio Castilho	Decio Castilho	Decio Castilho	Nelson	Nelson
16	**Cotecna Agent Id No.**	214358719	214358719	214358719	18398128	18398128
17	**Trucking Company**	Fassina	Fassina	Fassina	Fassina	Fassina
18	**Driver Name**	ADEMIR	ADEMIR	RENATO	ADEMIR	RENATO
19	**Driver License Number**	NA	NA	NA	NA	NA
20	**Truck License Number**	BXG6281	BXE6281	BWN8029	BXE6281	BWN8029
21	**Truck Odometer Reading**	1	1	1	1	1
22	**Internal Integrity Issue**	None	None	None	None	None
23	**External Integrity Issue**	None	None	None	None	None
24	**Carrier Empty Seal Number**	NA	NA	NA	NA	NA
25	**Tare Weight**	2210	2230	2230	2185	2250
26	**Bag Count**	320	320	320	320	320
27	**Bio Results (G/B/ NA)**	NA	NA	NA	NA	NA
28	**Chem Results (G/B)**	NA	NA	NA	NA	NA
29	**Radiation Reading (G/B)**	G	G	G	G	G
30	**Stuffing Issue**	None	None	None	None	None
31	**Stuffed Weight**	21410	21430	21430	21385	21450
32	**Unisys Tape Seal ID**	0001948	0001897	0001938	0002203	0001840
33	**Unisys RFID Seal ID**	MISSING	MISSING	MISSING	MISSING	MISSING
34	**Carrier Bolt Seal Number**	GT153571	GT169682	GT169700	GT169745	GT69709
35	**Unisys Bolt Seal Number**	97	0000095	0000098	0000099	0000096
36	**End Time (hh:mm)**	10:45	11:40	14:45	15:40	16:35
37	**Loading Date**	7-May-04	7-May-04	7-May-04	7-May-04	7-May-04

Figure – Solution Performance and Shipment Report

- **Weekly status reports –** This document will provide a tool for the project manager to communicate overall status, issues and resolutions to all relevant parties involved in the ICNCP Field Test. Shown below is an example of the Weekly Status Report that can be generated for the ICNCP Field Test.

Intelligent Cargo and Intelligent Network Port Logistics Chain Project (ICNCP)

Weekly Status Report

Date:	March 05, 2010
From:	Nishant Pillai
To:	Luis Montenegro, Luis Resano
Cc:	Gabrielle Mandel, Rodrigo Mota, Carlos Meleiro, Ted Langhoff

Current Status

No.	Item
1.	Unisys Team finalized the three logistics chains within the scope of the ICNCP project: • Export logistics chain – Mineracao Curimbaba • Import logistics chain – BASF S.A. • Cabotage logistics chain – Log IN
2.	Unisys Team conducted on-site surveys/ meetings with the following Mineracao Curimbaba supply chain stakeholders: • March 1st – 10:00 am to 12:00 pm – Grupo Curimbaba Logistics Department • March 1st – 2:00 pm to 4:00 pm – SAAM termais • March 2nd – 10:00 am to 12:00 pm – Alcace • March 2nd – 2:00 pm to 4:00 pm – Hipercon Almazenes • March 4th – 10:00 am to 12:00 pm – Santos Brazil Terminal • March 5th - 11:00 am to 7:00 pm – Mineracao Curimbaba & Alcace trucking (Poco de Caldas)
3.	Unisys Team has rescheduled the on-site surveys/ meetings with the following Mineracao supply chain stakeholders: • March11th – 10:00 am to 12:00 pm – Grupo CSAV • March 11th – 2:00 pm to 4:00 pm – Santos Brazil Terminal
4.	Unisys Team met with BASF S.A team on March 3rd at 2:00 pm. During the meeting, issues were raised with regards to information sharing and scheduling of site visits
5.	Unisys Team conducted a joint conference call with BASF leadership and supply chain stakeholders on March 5th to address all issues related to information sharing
6.	Unisys Team has confirmed on-site surveys/ meetings with the following BASF S.A. supply chain stakeholders: • March 8th – 10:00 am to 12:00 pm – Grupo Indaia • March 8th – 2:00 pm to 4:00 pm – Hamburg Sud • March 9th – 10:00 am to 12:00 pm – Essemaga • March 9th – 2:00 pm to 4:00 pm – Libra T37 • March 9th – 2:00 pm to 4:00 pm – BASF Demarchi plant
7.	Unisys Team conducted a conference call with Riciardo Ribeiro from Brasil ID project Team
8.	SEP introduced the Brasil ID project to the Unisys Team
9.	Unisys Team executed conference calls with Mr. Anderson Carvalho from LogIN and his team to discuss cabotage operations
10.	Unisys Team scheduled a on-site vist to LogIN TVV in the Port of Vitoria for Mar 14-15

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No.	Item
11.	A project debrief was requested and set up with US Commercial Services in Sao Paulo for Mar 12, 201 0 at 11:00 am

Next Steps

No.	Action Item	Org.	Task Owner	Due Date	Status
1.	Meet with Grupo Curimbaba suppliers in Santos	Unisys	Team	Mar 11	On-going
2.	Meet with Ricardo Ribeiro from Brasil ID project	Unisys	M. Adami	Mar 11	On-going
3.	Facilitate relationship with Point of Contact at SERPRO to discuss "Porto Sem Papel" system	SEP	Luis M.	Mar 02	Complete
4.	Facilitate relationship with Point of Contact at SERPRO through Receita Federal to discuss "SISCOMEX & SISCARGA" systems	SEP	Luis M.	Mar 02	On-going
5.	Meet with BASF S.A. suppliers in Santos	Unisys	Team	Mar 11	On-going
6.	Review Brasil ID system information	Unisys	Team	Mar 11	On-going
7.	Confirm meetings with BASF S.A. suppliers for week of March 8th	Unisys	N. Pillai	Mar 05	Complete
8.	Confirm logistics and attendees for Phase 1 close-out meeting in Brasilia	SEP	Luis. M	Mar 12	On-going
9.	Follow up with SEP on PR point of contact	Unisys	N. Pillai	Mar 10	On-going
10.	Conduct follow up call with LogIn on closing out As-is Discovery	Unisys	Team	Mar 09	On-going
11.	Meet with US Commercial Services	Unisys	Team	Mar 12	On-going
11.	Conduct on-site survey at LogIN TVV	Unisys	Team	Mar 14	On-going

Issues/ Open Items

No.	Issue/ Open Item	Owner	Due Date
1.	Need to get a formal Confidentiality Agreement signed between BASF & Unisys, which may impact level of information being shared by BASF for the project	Unisys & BASF	Mar 10
2.	Trucker strike at Santos Brasil impacted the meeting with Santos Brasil. It could not be completed due to operational issues at the terminal and has been rescheduled to March 11, 2010.	NA	NA
3.	Strike resulted in rescheduling of meetings with CSAV Group for March 11, 2010	NA	Na
4.	Both as-is discovery discussions with Santos Brasil & CSAV may impact deliverable production schedule	Unisys	Mar 25

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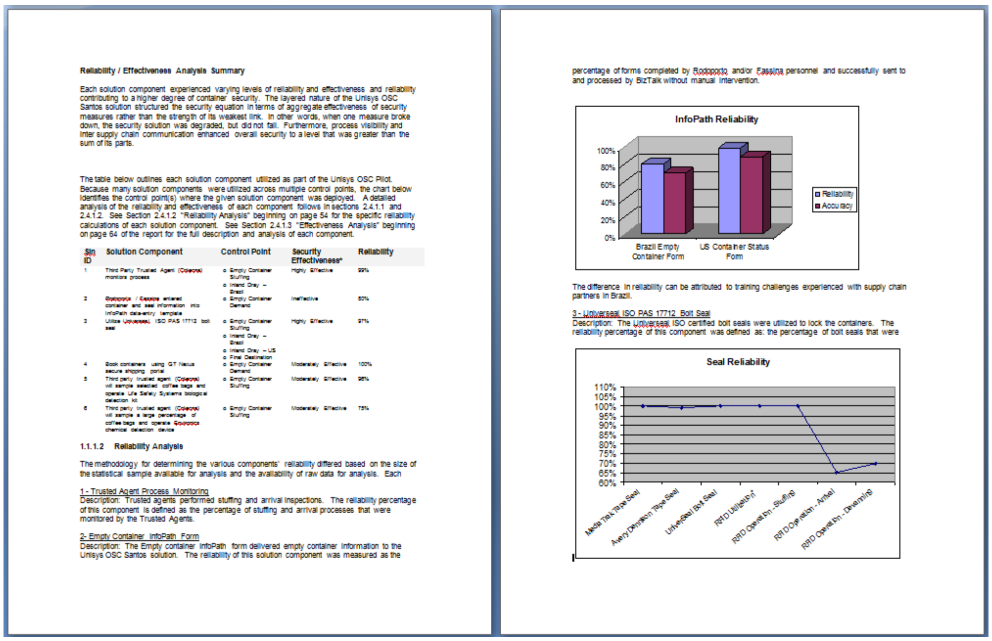
Figure – Weekly Status Report

Phase VI – Analysis and Reporting

The tasks performed by the Field Test team during the Reporting phase will lead to the generation of some key deliverables. These deliverables may include:

- **Draft/ Final Report –** The ICNCP Field Test team will prepare the Final Report to document the overall results of the project and will include detailed results, lessons learned, future / rollout requirements, costing metrics (e.g. cost per shipment tracking device, cost per reader, etc.), rollout recommendations. Shown below is an example of the Report that can be generated for the ICNCP Field Test



Reliability / Effectiveness Analysis Summary

Each solution component experienced varying levels of reliability and effectiveness and reliability contributing to a higher degree of container security. The layered nature of the Unisys OSC Santos solution structured the security equation in terms of aggregate effectiveness of security measures rather than the strength of its weakest link. In other words, when one measure broke down, the security solution was degraded, but did not fail. Furthermore, process visibility and inter supply chain communication enhanced overall security to a level that was greater than the sum of its parts.

The table below outlines each solution component utilized as part of the Unisys OSC Pilot. Because many solution components were utilized across multiple control points, the chart below identifies the control point(s) where the given solution component was deployed. A detailed analysis of the reliability and effectiveness of each component follows in sections 2.4.1.1 and 2.4.1.2. See Section 2.4.1.2 "Reliability Analysis" beginning on page 54 for the specific reliability calculations of each solution component. See Section 2.4.1.3 "Effectiveness Analysis" beginning on page 64 of the report for the full description and analysis of each component.

Sln ID	Solution Component	Control Point	Security Effectiveness*	Reliability
1	Third Party Trusted Agent (Cotecna) monitors process	o Empty Container Stuffing o Inland Dray – Brazil	Highly Effective	99%
2	Rodoporto / Fassina entered container and seal information into InfoPath data-entry template	o Empty Container Demand	Ineffective	80%
3	Utilize Universeal ISO PAS 17712 bolt seal	o Empty Container Stuffing o Inland Dray – Brazil o Inland Dray – US o Final Destination	Highly Effective	97%
4	Book containers using GT Nexus secure shipping portal	o Empty Container Demand	Moderately Effective	100%
5	Third party trusted agent (Cotecna) will sample selected coffee bags and operate Life Safety Systems biological detection kit	o Empty Container Stuffing	Moderately Effective	96%
6	Third party trusted agent (Cotecna) will sample a large percentage of coffee bags and operate Equipoise chemical detection device	o Empty Container Stuffing	Moderately Effective	75%

1.1.1.2 Reliability Analysis

The methodology for determining the various components' reliability differed based on the size of the statistical sample available for analysis and the availability of raw data for analysis. Each

1 - Trusted Agent Process Monitoring

Description: Trusted agents performed stuffing and arrival inspections. The reliability percentage of this component is defined as the percentage of stuffing and arrival processes that were monitored by the Trusted Agents.

2- Empty Container InfoPath Form

Description: The Empty container InfoPath form delivered empty container information to the Unisys OSC Santos solution. The reliability of this solution component was measured as the

percentage of forms completed by Rodoporto and/or Fassina personnel and successfully sent to and processed by BizTalk without manual intervention.

The difference in reliability can be attributed to training challenges experienced with supply chain partners in Brazil.

3 - Universeal ISO PAS 17712 Bolt Seal

Description: The Universeal ISO certified bolt seals were utilized to lock the containers. The reliability percentage of this component was defined as: the percentage of bolt seals that were

Figure – Final Report

- **Close Out Presentation –** This document will be used by the ICNCP Field Test team to close out the project with the relevant parties and discuss next steps. Shown below is an example of a Close Out presentation that can be generated for the ICNCP Field Test.

Figure – Close Out Presentation

2.4.3 Resource and stakeholder requirements

The success of the ICNCP Field Test pilot project will depend on the support of entities such as SEP, SERPRO, logistics chain partners and their suppliers and the Field Test team. The table below outlines the expected assignment of roles and responsibilities among the parties in the project. Project responsibilities have been assigned using the following abbreviations:

- **P** = Primary responsibility and accountability for the conduction, execution and completion of a given project activity or deliverable
- **A** = Assistance in the execution and completion of a project activity or deliverable
- **R** = Review of a project activity or deliverable
- **'-'** = No responsibility

Field Test team refers to personnel and solution provider partners including subcontractors providing hardware, software and services)

#	Field Test Tasks	Responsibility		
	Task Details	**Field Test Team**	**Logistics Chain Stake-holders**	**SEP/ SERPRO**
1.	Program Management of Field Test	-	-	P
2.	Project Management of participating logistics chains	P	-	-
3.	Mobilize Field Test team members	P	A	A
4.	Commit logistics chain and logistics chain stakeholders to implementation of field test solution		P	-
5.	Develop overall communication plan	P	-	A
6.	Develop overall communication plan for logistics chain stakeholders	P	R	-
7.	Facilitate Communication with government agencies and port authorities: • Receita Federal • Anvisa • Marinha Mercante • Casa Civil • Policia Federal • Autoridade Portuaria	A		P
8.	Communicate and obtain agreement for process change and process enabling technology with Unions, etc			P
9.	Facilitate communication with logistics chain partner organizations	R	P	-
10.	Deliver Field Test solution • Gap Analysis • Design and Development	P	R	A

#	Field Test Tasks	Responsibility		
	Task Details	Field Test Team	Logistics Chain Stake-holders	SEP/ SERPRO
	• Prototype and Evaluation • Testing and Evaluation • Analysis and Reporting			
11.	Select solution technology partners	P	-	R
12.	Set up and support IT infrastructure and operation	A	-	P
13.	Perform end-user training	P	R	A
14.	Rollout Field Test solution	P	A	R
15.	Support operation of Field Test solution	P	-	A
16.	Technical administration of pilot security solution	A	-	P
17.	Define reporting template	P	-	R
18.	Review and accept Field Test solution • Gap Analysis • Design and Development • Prototype and Evaluation • Testing and Evaluation Analysis and Reporting	-	R	P
19.	Review and accept final ICNCP report analysis and findings	-	-	P
20.	Coordinate availability of key personnel in port operations	-	-	P
21	Coordinate availability of key personnel in logistics chain partner organizations	A	P	-
22.	Authorize installation of infrastructure on Port Authority property required for operation of Field Test solution	-	-	P
23.	Authorize installation of infrastructure in each of the logistics chain partner organizations required for operation of Field Test solution	A	P	-

Table – Resource and Stakeholder Requirements

2.4.4 Contractual and labor requirements

In order to move forward with the Field Test Implementation of the ICNCP project, SEP will have to solicit technical proposals from qualified firms to provide expert consulting services to assist SEP in deploying the ICNCP Field Test design that will allow Brazil to move toward an Intelligent Cargo and Intelligent Network Port Logistics Chain. As part of this section, the Unisys Team has documented the key contractual, proposal, and labor requirements as well as the criteria to award/ select the right technical advisor to help SEP execute this strategic project.

Contractual Requirements/ Assumptions
In issuing this solicitation, the following assumptions will be set forth by SEP:

- SEP will use the term "Request for Proposals (RFP)" for this solicitation of a formal technical proposal including qualifications statement
- The term "Proposer" will mean firms, including any and all sub-contractors, which respond to the RFP and submits a formal proposal and which may or may not be successful in being awarded this procurement.
- SEP will issue instructions to all proposers to carefully examine this RFP
- All proposers have conducted a thorough examination and investigation that they have become familiarized with local conditions and the nature of problems to be solved during the execution of the project
- Proposer shall be fully responsible for all costs incurred in the development and submission of the proposal or any other cost incurred by proposer prior to issuance of an agreement or contract
- Project funds are not to be used to pay taxes or duties under the laws of Brasil
- The proposal shall be binding upon the proposer for sixty (60) days after the proposal due date, and proposer may withdraw or modify the proposal at any time prior to the due date upon written request, signed in the same manner and by the same person who signed the original proposal
- The successful proposer shall be required to:
    - Furnish all supplies, supervision, transportation, and other execution accessories, services, and facilities
    - Provide and perform all necessary labor
    - In accordance with good technical practice, with due diligence, and in accordance with the requirements, stipulations, provisions and conditions of the RFP and the resultant contract, execute and complete all specified work to the satisfaction of SEP

Proposal Requirements
To expedite proposal review and evaluation, and to assure that each proposal receives the same orderly review, the Unisys Team will request that SEP require all proposals to follow the format described below:

1. Introduction and Executive Summary
An Executive Summary should be prepared describing the major facts or features of the proposal, including any conclusions, assumptions, and generalized recommendations the Proposer desires to make. Proposers will be requested to make every effort to limit the length of the Executive Summary to no more than five (5) pages.

2. Company Information
The proposer will be required to provide the following information relative to the proposer's firm. If the proposer is proposing to subcontract some of the proposed work to another firm(s), similar information must be provided for each subcontractor. Proposers will be requested to limit the length of the company profile Information to one (1) page per firm

- Name of firm and business address, including telephone and fax numbers
- Year established (include former firm names and year established, if applicable)
- Type of ownership and parent company, if any
- Project Manager's name, address, telephone and fax number

3. Negotiation Prerequisites

The proposer will be required to discuss any impact of any current or anticipated commitments which may impact the ability of the proposer or its subcontractors to complete the project as proposed and within the project schedule. This section will also identify any specific information which is needed from SEP before commencing contract negotiations.

4. Organizational Structure

The proposer will be required to describe the proposed project organizational structure and discuss how the project will be managed including the principal and key staff assignments for this project. The proposer will also be required to identify the project manager who will be the individual responsible for this project and the authority to act on behalf of the proposer in matters related to the proposed project.

5. Key Personnel and Management Plan

The proposer will be required to provide a listing of personnel (including subcontractors and consultants) as well the following information for key project staff:

- Position in the project
- Pertinent experience
- Curriculum vitae
- Other relevant information

A statement confirming the availability of the proposed project manager and key staff over the duration of the project must be included in the proposal. If subcontractors are to be used, the organizational relationship between the firms must be described

The proposer will be required to submit a high level management plan and highlight the level of effort for the project period, by activities and tasks.

6. Technical Approach and Work Plan

The proposer will be required to describe in detail the proposed technical approach and work plan. This section should include a brief narrative of tasks within each activity series. The proposer will also be required to prepare a detailed schedule of performance that describes all activities and tasks within the Work Plan, including periodic reporting or review points, incremental delivery dates, and other project milestones.

7. Experience and Qualifications

It is very important for SEP to select a proposer with the following past experience to support the execution of the pilot project:

- **Extensive Logistics Chain Security Experience –** A team that has delivered successful projects involving the research, analysis, testing, implementation, and project management of cargo monitoring and security technology projects
- **Local Resources and Experience –** A team that includes local resources with direct experience in Brasil and maritime port logistics operations and businesses. These resources will provide the experience, expertise, and credibility with the stakeholders in the research, analysis, development, reporting and management of this project.

- **Cargo & Port Security Technology Expertise** –A team with significant expertise in delivering mission critical technology projects focused on cargo tracking, port and logistics chain security who should be able to leverage its knowledge base and lessons learned in working with some of the world's most sophisticated cargo monitoring, tracking and security technologies including RFID, electronic seals, container security devices, non-intrusive inspection, and radiation detection to the fullest benefit of SEP.
- **Strategic Relationships** –A team that maintains a close network of relationships with critical bodies, governmental agencies globally, decision-makers and policy-setters in the logistics chain arena such as the World Customs Organization (WCO), International Standards Organization (ISO) and International Maritime Organization (IMO), government agencies like the Department of Transportation (DOT), US Department of Homeland Security (DHS) and some of the key stakeholders for this project including port authorities, port terminal operators, vessel carriers, freight forwarders, security companies, customs brokers and large exporters.
- **Large Program Execution Knowledge** – A team that has implemented multiple logistics chain projects over the past several years with SEP and a clear understanding of the agency's objectives and operating protocols.

The proposer will be required to submit as many as possible but not more than six (6) relevant and verifiable project references. The following information will be needed to be provided:

- Project name
- Name and address of client
- Client contact person
- Period of Contract
- Description of services provided
- Dollar amount of Contract
- Status and comments

Overall,

- The proposer will be strongly encouraged to include in their experience summary primarily those projects that will be similar to or larger in scope than the project described in this RFP.
- Proposal sections and pages will be required to be appropriately numbered and the proposal shall include a Table of Contents.
- Proposers will be encouraged to submit concise and clear responses to the RFP
- Proposals should contain all elements of information requested without exception

Selection Criteria
The Unisys Team recommends that in order to move forward, the proposals will be required to be initially evaluated by a procurement selection committee of representatives from SEP. The Committee will be required to conduct a final evaluation and after the completion of ranking of qualified proposers, SEP will need to negotiate a contract with the best qualified proposer.

In order to select the right technical advisor, the Unisys Team has recommended the following selection criteria to SEP:

No.	Selection Criteria	Weight
1.	**Logistics Chain Security Experience** Experience and capability of the firm including a demonstrated expertise in cargo information technology systems and an understanding of the processes in the port logistics chain and the information supporting those processes	30 points
2.	**Project Execution Experience** Demonstration of the understanding of the issue and required tasks. Overall organization, completeness, and quality of proposal, including cohesiveness, conciseness, and clarity of the proposed work plan and responsiveness of the proposal to the technical scope and requirements	30 points
3.	**Cargo & Port Security Technology Expertise** Suitability of key team members for their assignments, with particular consideration of qualifications, experience, availability, accessibility, special expertise, and recent experiences relevant to information technology	30 points
4.	**Local Resources and Experience** Experience in working in Latin American countries. The selected consultant's project manager and key staff should also be capable conducting technical discussions in Portuguese	10 points

Table – Selection Criteria

2.4.5 Potential risks and issues

The primary task of the Intelligent Cargo and Intelligent Network Port Logistics (ICNCP) project was to design a future baseline for a representative export logistics chain in Brazil. This served to enable the Unisys team to gain a more complete understanding of how the logistics chain works in Brazil's ports. It allowed the team to observe how the many disparate entities and parts of the logistics chain interact with each other to achieve a common objective. It is readily stipulated that the available time necessarily required a focus on a narrow segment of the overall process. The logistics chains that participated in the project were carefully selected to be as representative as possible of most typical logistics chains in order to draw valid conclusions that can be extrapolated to the entire process, going forward.

The findings summarized below represent the more significant issues that surfaced during the execution of the project. To identify every possible issue in the logistics chain would require far greater time and resources than was available under the parameters of this feasibility study. It is emphasized, however, that the findings listed here were either communicated to or observed by the Unisys Team and can therefore be said to be sufficiently important to warrant further examination.

1. Entities involved in the logistics chain operations have modified their processes and procedures towards automating their core business practices to be more agile in the logistics chain. Development of a single-window management system would alleviate the cost and necessity of developing different proprietary systems to accomplish the same objective.

2. Associacao Brasileira de Terminais e Recintos Alfandegados (ABTRA) is developing a system to integrate the terminals and warehouses in the Port of Santos to a single database for those needing access to the geography of the port. Some concern has been expressed as to how this system will interact with existing Receita Federal do Brasil systems. For example, questions include whether these systems will be integrated to form a single window system and whether they will have application outside the Port of Santos.
3. The impending adoption of Porto sem Papel is being viewed with some apprehension as to whether it will constitute a step forward or simply be yet another system adding to the already crowded field. Across the entire logistics chain, a commonly expressed concern pertains to the confidentiality of business data. The safeguarding of proprietary and confidential information is a high priority in virtually all business models. Currently, businesses have misgivings about information sharing out of concern that confidential data on value or production may end up with a domestic competitor. This anxiety over data security acts as a barrier to seamless and secure information exchange between all relevant parties.
4. REDEX is widely regarded as a positive development, providing a streamlined method for cargo export declaration when physically present at a customs bonded facility. This process extends the jurisdictional borders of Receita Federal do Brasil beyond the maritime terminal facilities and assists in the capacity building efforts of Brazilian ports like Santos that are running out of space. There is no such provision for imports, which are not allowed to leave the maritime terminal facilities without clearance from Receita Federal. There appear to be no plans for a "REDIMP" program.

5. With the advent of Porto sem Papel, a common question is whether Receita will continue to require physical Import and Export declarations to be delivered at the Customs office. If this will continue to be a requirement, it would seem to be counter to the expressed aims of the Porto sem Papel concept.
6. Level of information shared by Federal government agencies with logistics chain partners was found to be less than required. The lack of basic understanding and requirements of the key systems needed to import or export containerized cargo was found to be lacking. To address this specific need, the Unisys Team put together the following table based on our limited understanding of the current logistics system environment in Brazil
7. With the recent changes within SEP and other key federal government agencies, the commitment and excitement to develop and deploy a Field Test (pilot) project has diminished. Considering the timing, key personnel and champions within SEP with the assistance of the Unisys Team and USTDA, will need to reengage with the new minister ate SEP and his leadership team to position the ICNCP project for success

2.4.6 Logistics Chain Technology Workshop

As per the requirements set forth in the TOR, the Unisys Team jointly with SEP conducted technical workshops/ meetings with key export logistics chain stakeholders in order to validate the To-Be design as well as share to the results of the Impact Analysis and acquire feedback. These technology workshops/ meetings were executed to present and discuss the results of the ICNCP project with relevant stakeholders including government representatives, private sector representatives from the trade community and technology vendors. This step was key to laying the foundation for the success of the follow on effort of the ICNCP project. The schedule of the stakeholder workshops/ meetings is shown below:

#	Date	Workshop/ Meeting Name
1.	Sept 20, 2010	Carga Inteligente - Analise Técnica da Solução
2.	Sept 21, 2010	Reunião com a Receita Federal - Projeto ICNCP
3.	Sept 22, 2010	Carga Inteligente - Benefícios do Projeto para o Governo
4.	Sept 23, 2010	Rastreamento de Carga

Table – Workshop/ Meeting Schedule

Listed below is key information of each of these workshops/ meetings executed from September 20 to 23, 2010 including workshop/ meeting agendas, participants list, results, presentation summaries and follow up discussion summaries

Carga Inteligente - Analise Técnica da Solução
Date: 20 September, 2010

Focus:
The purpose of the Carga Inteligente - Analise Técnica da Solução workshop was to:

- Provide the stakeholders with an update on the ICNCP project
- Share the high level To-Be technical design and information on the container monitoring mechanisms
- Conduct a To-Be Design walkthrough
- Communicate the benefits of the ICNCP To-Be design
- Acquire and document stakeholder feedback
- Get high level buy-in for the ICNCP To-be design from the stakeholders

Agenda:
The agenda of the Carga Inteligente - Analise Técnica da Solução workshop is shown below:

Time	Focus	Name of Presenter
14:00 - 14:10	Abertura do Evento	**Luis Fernando Resano** Diretor do Departamento de Sistemas de Informações Portuárias
14:10 - 14:30	Introdução	**Luis Claudio Santana Montenegro** Assessor da Secretaria de Portos da Presidência da República

Time	Focus	Name of Presenter
14:30 - 16:00	Carga Inteligente	**Nishant Pillai** **Unisys**
16:00 - 16:20	Mesa de debates	Instituto Von Brown MCT
16:20 - 16:40	Mesa de debates	**José Manuel Pombo** DBTrans
16:40 - 17:30	Debates	

Table – Workshop/ Meeting Agenda

Participants:

The following personnel attended the Carga Inteligente - Analise Técnica da Solução workshop:

	Nome	Empresa	Telefone	E-mail
1	Carla C. D. Sampaio Neves	GEA / FEESC	30220092	carla.neves@labtrans.ufsc.br
2	ROBERTO PLA'	SERPRO	20218628	robertos.pla@hotmail.com
3	Antonio Pereira Alves Filho	CGMP/Sem Parar	11-36518037	pereira.alves@semparar.net
4	MARCO ROBERTO KUCHEMBUCK PAVAN	CGMP/Sem Parar	11-36518039	marco.pavan@semparar.net
5	MAURO L. COIMBRA	Centro Von Braun	11.8208.4224	COIMBRA@VONBRAUNLABS.COM.BR
6	EDUARDO J. SOUZA	VISA DO BRASIL	(11)2102.0359	ESOUZA@VISA.COM
7	Aldenlan Marinho M. Moreno	Fundação CPqD	(61)33261844	aldenlan@cpqd.df.com.br
8	ALESSANDRO GONZALEZ ANDREO	Fundação CPqD	(19)3705-6380	andreo@cpqd.com.br
9	Sebastião Sahão Jr	CPqD	(19) 3705-6623	tucc@cpqd.com.br
10	Daniel Canovas Feijó Araujo	MIN. CIDADES - DENATRAN	(61) 2108-1864	daniel.araujo@cidades.gov.br
11	Antonio Guimarães Rosa	MCIDADES - DENATRAN	(61)2108.1867	antonio.rosa@cidades.gov.br.
12	LUIZ HAMILTON L. MENDONÇA	SEP/PR	(61)3411-3748	LUIZ-HAMILTON@PLANALTO.GOV.BR
13	DORIVAL FARIAS QUADROS	SEP/DESIP	(61) 3411-3733	dorival.quadros@planalto.go
14	Jeffrey Mendes Drago	INTERMEC	(11)37116793	jeffrey.drago@intermec.com
15	MARCUS V. CINTRA DOS SANTOS	SEP / M.B	(61)3411.3733	cintra.mb@ig.com.br
16	Rodolfo Augusto Rocha Monteiro	SEP/DESIP	6134113733	rodolfo.monteiro@planalto.gov.br
17	Tiago Lima Tarocco	SEP/DSIP	(61)34113733	tiagolt@gmail.com
18	Mariana Pescatori C. da Silva	SEP/DSIP	(61) 34113733	mariana.pescatori@planalto.gov.br
19	MARCUS BORGES	GEA/FEESC	(61)30220092	marcusjborges@gmail.com
20	BRAULIO CARSALADE H. GUSMÃO	SUNAC/SERPRO	(61)20218597	braulio.gusmao@SERPRO.gov.br
21	José Roberto Bastos Fernandes	SEP/DSIP	(61)3411.3735	Jose.Fernandes@planalto.gov.br
22	LUIS CLAUDIO S. MONTENEGRO	SEP/DESIP	(61)30220092	LUIS.MONTENEGRO@PLANALTO.GOV.BR
23	Eugenio Cesar da Silva	SEFAZGO/ENCAT	(62)3269-2201	eugenio-cs@sefaz.go.gov.br
24	JOSÉ ALFREDO A. SILVA	SEP/DDO	(61)8163-9235	jose.alfredo.silva@ibest.com.

Table – Workshop/ Meeting Attendees

Results:
Following were the overall results of the Carga Inteligente - Analise Técnica da Solução workshop:

1. SEP and the Unisys Team was able to present the high level technical design to representatives of the provide sector
2. The technology solution representatives from companies such as Intermec were appreciative of the high level design which included ISO18185 standards based container monitoring mechanisms
3. Representatives from the local technology providers and universities working in the RFID space in Brasil aligned themselves with the ICNCP project as it incorporates best practices and open standards for RFID technology frequencies within Brasil

Presentation summaries:
Shown below is a snapshot of the Carga Inteligente - Analise Técnica da Solução workshop presentations.

Figure – Workshop/ Meeting Presentation/s

Follow up discussion summary:
The Carga Inteligente - Analise Técnica da Solução workshop led to the following next steps:

- The Unisys Team met with representatives of the Von Braun University in Campinas, Brasil to discuss the ICNCP project and Brasil ID project being executed for the Finance Ministry and agreed to set up a follow up meeting to discuss how the two project teams could work together
- The Unisys Team met with additional technology vendors who wanted to participate in the ICNCP project. Some of the vendors completed the solution questionnaire and the vendors that met the project requirements were included in the Impact Assessment report.

Reunião com a Receita Federal - Projeto ICNCP
Date: 21 September, 2010

Focus:
The purpose of the Reunião com a Receita Federal - Projeto ICNCP was to:

- Provide Receita Federal (Brasil Customs) with an update on the ICNCP project
- Share the high level To-Be design and conduct a To-Be Design walkthrough
- Communicate the benefits of the ICNCP To-Be design
- Acquire and document Receita Federal feedback
- Get high level buy-in for the ICNCP To-be design from Receita Federal
- Discuss next steps

Agenda:
The agenda of the Reunião com a Receita Federal - Projeto ICNCP is shown below:

Time	Focus	Name of Presenter
09:00 - 09:10	Abertura do Evento	**Fabrizio Pierdermonico** Vice Ministro da SEP
09:10 - 09:20	Introdução	**Luis Fernando Resano** Diretor do Departamento de Sistemas de Informações Portuárias
09:20 - 09:30	Carga Inteligente	**Rodrigo Mota** USTDA
09:10 - 11:00	Carga Inteligente	**Nishant Pillai** **Unisys**
11:00 - 12:00	Debates	

Table – Meeting Agenda

Participants:
The Brasilian Customs personnel who attended the Reunião com a Receita Federal - Projeto ICNCP meeting did not want to be listed. Additional information regarding the attendees can be obtained by contacting SEP leadership.

Results:
Following were the overall results of the Reunião com a Receita Federal - Projeto ICNCP meeting:
1. SEP and the Unisys Team was able to present the high level technical design to representatives of Brasilian Customs (Receita Federal) and Finance Ministry (Ministério da Fazenda)
2. Representatives from the Brasilian Customs (Receita Federal) and Finance Ministry (Ministério da Fazenda) were excited to see the results of the high level design and understood the benefits of the project to operations, security and revenue collection.

Presentation summaries:
Shown below is a snapshot of the Reunião com a Receita Federal - Projeto ICNCP presentation made during the meeting with Receita Federal do Brasil.

Figure – Workshop/ Meeting Presentation/s

Follow up discussion summaries:

The Reunião com a Receita Federal - Projeto ICNCP workshop led to the following next steps:

- Brasilian Customs (Receita Federal) and Finance Ministry (Ministério da Fazenda) requested SEP to set up a follow up meeting to discuss the set up of a working group to get all the necessary parties to discuss the alignment between the SISCOMEX, Sistema Porto Sem Papel and ICNCP projects.

Carga Inteligente - Benefícios do Projeto para o Governo

Date: 22 September, 2010

Focus:

The purpose of the Carga Inteligente - Benefícios do Projeto para o Governo workshop was to:

- Provide Brasilian government agencies with an update on the ICNCP project
- Share the high level To-Be design and conduct a To-Be Design walkthrough
- Communicate the benefits of the ICNCP To-Be design
- Acquire and document feedback from government agencies

Agenda:

The agenda of the Carga Inteligente - Benefícios do Projeto para o Governo workshop is shown below:

Time	Focus	Name of Presenter
08:30 - 08:40	Abertura do Evento	**Luis Fernando Resano** Diretor do Departamento de Sistemas de Informações Portuárias
08:40 - 09:00	Introdução	**Luis Claudio Santana Montenegro** Assessor da Secretaria de Portos da Presidência da República
09:00 - 10:30	Carga Inteligente	**Nishant Pillai** Unisys
10:40 - 11:00	Mesa de debates	**Barral** Secex
11:00 - 11:20	Mesa de debates	**José Manuel** Camex
11:20 - 12:00	Debates	

Table – Workshop/ Meeting Agenda

Participants:

The following personnel attended the Carga Inteligente - Benefícios do Projeto para o Governo:

	Nome	Empresa	Telefone	E-mail
1	NISHANT PILLAI	UNISYS CORP	11-94982883	NISHANT.PILLAI@UNISYS.COM
2	RODRIGO MOTA	USTDA	11-78759883	RMOTA@USTDA.GOV
3	LUIS RESANO	SEP	34113733	LUIS.RESANO@PLANALTO.GOV.BR
4	MARLI OPICE	ECORODOVIAS	11-99323863	mopice@terra.com.br
5	Ronaldo de Souza Forte	Santos Brasil/M	(13) 78055756	[illegible]
6	WILLIAM A. CADY JR.	FENOP	(61)32267005	fenop@fenop.com.br
7	RICARDO ABBRUZZINI FILHO	SANTOS BRASIL	13-33441076	RAF@SANTOSBRASIL.COM.BR.
8	ARMINDO ADEGAS	SANTOS BRASIL	13 9132-9073	arc@santosbrasil.com.br
9	MANOEL JORGE LAUTENSCHLAEGER	BASF S.A.	1130433293	MANOEL-JORGE.LAUTENSCHLAEGER@BASF.COM
10	Francisco Nunes	INFRAERO	61 33123127	FRANCISCONUNES@INFRAERO.GOV.BR
11	MATHEUS MILLER	ABTRA	1321057300	MMILLER@ABTRA.com.br
12	VANDER SERRA de ABREU	ABTRA	1321057300	VSABREU@ABTRA.com.br

Table – Workshop/ Meeting Attendees

Results:

Following were the overall results of the Carga Inteligente - Benefícios do Projeto para o Governo workshop:

- SEP and the Unisys Team was able to present the high level technical design to representatives of Brasilian government agencies including CAMEX, SECEX, Infraero, Marinha Mercante, etc.

- Representatives from the Brasilian government agencies were excited to see the results of the high level design and understood the benefits of the project to operations, security and revenue collection.

Presentation summaries:
Shown below is a snapshot of the Carga Inteligente - Benefícios do Projeto para o Governo workshop presentations.

Figure – Workshop/ Meeting Presentation/s

Follow up discussion summaries:
The Carga Inteligente - Benefícios do Projeto para o Governo workshop led to the following next steps:

- SECEX and CAMEX requested SEP to set up a follow up meeting with SEP and the Unissy Team

Rastreamento de Carga

Date: 23 September, 2010

Focus:
The purpose of the Rastreamento de Carga workshop was to:

- Provide the stakeholders with an update on the ICNCP project
- Share the high level To-Be design and provide visibility to the stakeholder community
- Conduct a To-Be Design walkthrough
- Communicate the benefits of the ICNCP To-Be design
- Listen to issues the stakeholders might have
- Address the concerns of the stakeholders
- Provide clarifications to the stakeholders
- Acquire and document stakeholder feedback
- Get high level buy-in for the ICNCP To-be design from the stakeholders

Agenda:
The agenda of the Rastreamento de Carga workshop is shown below:

Time	Focus	Name of Presenter
08:30 - 08:40	Abertura do Evento	**Luis Fernando Resano** Diretor do Departamento de Sistemas de Informações Portuárias
08:40 - 09:00	Introdução	**Luis Claudio Santana Montenegro** Assessor da Secretaria de Portos da Presidência da República
09:00 - 09:45	Rastreamento Carga Portuária	**Nishant Pillai** Unisys
09:45 - 10:00	Debates	
10:00 - 10:30	ISO 28000	**Luis Fernando Resano** Diretor do Departamento de Sistemas de Informações Portuárias
10:30 - 10:45	Debates	
11:00 - 11:45	Projeto Carga Inteligente	**Marcelo Patricio** Libra T37
11:45 - 12:00	Debates	
	Almoço	
14:30 - 15:15	Operador Econômico Autorizado	**Juraci** Receita Federal
15:15 - 15:30	Debates	

Table – Workshop/ Meeting Agenda

Participants:
The following personnel attended the Rastreamento de Carga workshop:

	Nome	Empresa	Telefone	E-mail
1	NISHANT PILLAI	UNISYS CORP	11-94982883	NISHANT.PILLAI@UNISYS.COM
2	RODRIGO MOTA	USTDA	11-78759883	RMOTA@USTDA.GOV
3	LUIS RESANO	SEP	34113733	LUIS.RESANO@PLANALTO.GOV.BR
4	MARLI OPICE	ECORODOVIAS	11-99323863	MOPICE@TERRA.COM.BR
5	Ronaldo de Souza Leite	Santos Brasil	(13) 78057556	[illegible]
6	WILLIAM A. CADY JR.	FENOP	(61) 32267005	fenop@fenop.com.br
7	RICARDO ABBRUZZINI FILHO	SANTOS BRASIL	13-33441076	RAF@SANTOSBRASIL.COM.BR.
8	ARMINDO ADEGAS	SANTOS BRASIL	13 9132-9073	arc@santosbrasil.com.br
9	MANOEL JORGE LAUTENSCHLAEGER	BASF SA.	1130433293	MANOEL-JORGE.LAUTENSCHLAEGER@BASF.COM
10	Francisco Nunes	INFRAERO	61 33123127	FRANCISCONUNES@INFRAERO.GOV.BR
11	MATHEUS MILLER	ABTRA	1321057300	MMILLER@ABTRA.COM.BR
12	VANDER SERRA DE ABREU	ABTRA	1321057300	VSABREU@ABTRA.COM.BR
13	DANIELE ANDREWS	U.S. DEPARTMENT OF COMMERCE	61-3312-7458	daniele.andrews@trade.GOV
14	MARCELO CONCEIÇÃO	ABRATEC	21-22338205	tecnico@abratec-terminais.org
15	MARCELO PATRICIO	Grupo Libra	11 9366 8721	MPATRICIO@GRUPOLIBRA.COM
16	GERMAINE ROBINSON	ABTRA	13 97121486	grobinson@abtra.com.br.
17	Leandro Modesto Coimbra	Mattos Filho Advogados	(61) 9277-6001	lcoimbra@mattosfilho.com.br
18	Renata Correia Cubas	Mattos Filho Advog.	(11) 31477799	rcorreia@mattosfilho.com.br
19	João Antônio Gama	Mattos Filho Advogados	(61) 8160-4262	jgama@mattosfilho.com.br
20	RUY JORGE RODRIGUES PEREIRA FO	PETROBRAS	6134029138	[illegible]
21	THAÍS HELENA HENRIQUES CHAVES	SYNDARMA	(21) 3232 5600	thais@syndarma.org.br
22	Luiz Antonio Borges Mendes	UNISYS	61-91448908	luiz.mendes@br.unisys.com
23	MARCELO LUIZ BARBOSA NEVES	UNISYS	(21) 3523-5105	MARCELO.NEVES@BR.UNISYS.COM
24	Clóvis Chiaravallot.	UNISYS	(11) 9252-6391	clovis.chiaravalloti@br.unisys.com.
25	JOVALINO PIRES	AEB / cbi	(21) 25440048	logistica@aeb.org.br
26	ANDERSON CARVALHO	LOGIN - TVV	(27) 3182 7100	anderson.carvalho@login.logistica
27	ANDREAS KLIEN	MULTITERMINAIS	21-30956634	ANDREAS@KLIEN.NET
28	Ricardo MARAR	The World Bank	21-81561006	RMARAR@worldbank.org
29	JOÃO EMILIO FREIRE FILHO	ABTP	21-8868-3324	JEFF@ABTP.ORG.BR
30	Fabiano Vieira	GEA (SEP/UFSC)	61-9329-7191	Fabiano.vieira@labtrans.com
31	LUIS BALDEZ	ANUT	61 81239460	baldez.luis@gmail.com
32	José Renato Inácio de Rosa	FED. NAC. PORTUÁRIOS	61-3322-3196	FNPORTUARIOS@TERRA.COM.BR
33	José Vitor Macedo	FIESP	11-35494243	jvmacedo@fiesp.org.br

Table – Workshop/ Meeting Attendees

Results:
Following were the overall results of the Rastreamento de Carga workshop:
1. SEP and the Unisys Team was able to present the project overview and high level design to representatives of the provide sector including logistics providers, terminal operators, warehouse companies
2. The private sector representatives were excited to gain visibility to he high level design of the ICNCP project that incorporated best practices, RFID technology and integration of severall systems within Brasil.

Presentation summaries:
Shown below is a snapshot of the Rastreamento de Carga workshop presentations made during the workshop.

Figure – Workshop/ Meeting Presentation/s

Follow up discussion summaries:
The Rastreamento de Carga workshop led to the following next steps:
- Several entities requested follow up meetings with SEP and the Unisys Team to disucss how they could participate in the project
- SEP and the Unisys Team conducted follow up meetings with Grupo Ecorodovias, Grupo Libra, DB Trans and several other entities.

3 Summary

3.1 Phase 1 - Establishing the Logistics Chain Baseline

The primary task of the Phase 1 of the Intelligent Cargo and Intelligent Network Port Logistics (ICNCP) project was to establish a baseline for a representative supply chain in Brazil. This served to enable the Unisys team to gain a more complete understanding of how the logistics chain works in Brazil's ports. It allowed the team to observe how the many disparate entities and parts of the logistics chain interact with each other to achieve a common objective. It is readily stipulated that the available time necessarily required a focus on a narrow segment of the overall process. The logistics chains that participated in the project were carefully selected to be as representative as possible of most typical logistics chains in order to draw valid conclusions that can be extrapolated to the entire process, going forward.

The findings summarized below represent the more significant issues that surfaced during the Phase 1 As-Is Baseline analysis. To identify every possible issue in the logistics chain would require far greater time and resources than was available under the parameters of this feasibility study. It is emphasized, however, that the findings listed here were communicated to the Unisys Team by multiple parties during the interviews/ on-site surveys and can therefore be said to be sufficiently important to warrant further examination.

Policies, Procedures and Regulations

Listed below are the findings of the Unisys Team as a result of the As-Is Baseline Analysis conducted as part of the execution of the Intelligent Cargo and Intelligent Port Logistics Chain project. These findings are more focused towards the area of overall policies and procedures currently present in the import, export and cabotage logistics chain operations, regulations and local port requirements

1. Receita Federal do Brasil through the SISCOMEX Carga system requires that Container Shipping Lines declare the empty containers scheduled for shipment 72 hours in advance of the discharge date. This effectively removes these containers from the inventory of available containers, even if a declared container is subsequently not used. For example, if there is a demand for an empty container by an Exporter, the Container Shipping Line is not able to fulfill this demand with a declared but unused container as the system does not allow them to de-obligate the declared empty containers and provide them to the Exporter to meet the demand. If the Container Shipping Line agrees to fulfull the demand, it must reposition the container from another location if sufficient undeclared containers are not available, even though unused empty containers may be available on site. This practice is cost prohibitive and a significant constraint on the dynamic nature of the logistics chain. This inability to effectively manage container assets creates a logistics bottleneck for the industry.

2. Inspection of wood based storage products within imported containers, including pallets, significantly delays the release of containers being imported from the USA and Asia – often by an average of 4 days, sometimes as much as 8 days. At one time, this inspection could be performed by third-party validators; however, the current practice requires that only

Agriculture Ministry officials are authorized to perform this inspection. This workload places an additonal strain on available Agriculture Ministry resources.

3. Terminal operators may inspect containers for damage, roadability, security compliance, and to detect possible theft or contraband. Privacy restrictions, however, prohibit similar inspection of truck cabs/cabins. This creates a potential liability in security best practices.

4. Containers may be designated for inspection. In some instances, inspection by multiple agencies is required. There is often no coordination between agencies to accomplish these inspections. Instead, multiple inspections may be performed by multiple agencies, sometimes over multiple days. The practice of scheduling multiple inspections in isolation from each other generates significant delays and hence needs to be addressed via an integrated inspection schedule/standard operating procedure to reduce the dwell time of containers at Brazilian ports.

5. Clearance inspections by terminal operators is allowed and accepted by Customs for those containers discharged at the port. Inspection of in-bond transit containers, however, can only be performed by Customs officials. This added workload stretches the already thin Customs resources and causes delays for in-bond transit containers not only at the terminal but also for arrival at final destination. Container trucks may be required to remain in the terminal overnight because inspections could not be completed during the day. This has a severe impact on the available capacity of the container discharge terminals as they have to allocate segretgated areas for the staging of these in-bond trasit containers. This process also impacts the overall security posture of the terminal, as this allows the truck drivers unfettered access into secure areas within the terminals.

6. The lack of information sharing protocols results in the same report data being submitted multiple times to multiple agencies (port authority, Siscomex Carga, etc.). Such repetitive data entry creates delays in the logistics chain operations, adds to business costs to all the entities involved in the logisitcs chain and raises the probability of data discrepancies between systems, further delaying the logistics chain operations.

7. Instances were observed of Customs requiring screen printouts of computer documents for physical signature and processing. As an example, for the export of cargo from Brazil, Shipper/Exporter and/or their customs brokers print out the screens of SISCOMEX Export system to confirm the clearance of the cargo within the SISCOMEX Export system. This is done in order for the container terminal to be able to certify that Brazil customs had cleared the cargo and it was available to be loaded onto an export vessel. In such cases, computers are being used to generate paper documents, defeating the purpose of electronic processing. Paper based processes are being encouraged as the current electronic systems are not fully integrated or based on industry best practice processes of cargo clearance.

8. In an effort to modernize the import/export process quickly, government agencies are automating their procedures and processes without a comprehensive review. In such cases, inadequate or counterproductive regulations and procedures defeat the benefits of automation. For example, another Unisys study of entry and control procedures of a European country identified a process that required no less than 31 signatures to process an import. When this was brought to the attention of the authorities, they simply automated the process while keeping the redundant and inefficient procedures in place. The full benefits of automation were not able to be realized.

9. There exists no formal private sector consultative group with revolving membership that government officials can engage in administering, managing and deploying import-export systems. In the US, for example, there exists the Commercial Operations Advisory Committee (COAC), an advisory committee established in accordance with the provisions of the Federal Advisory Committee Act. The committee provides advice to the Commissioner of US Customs and Border Protection, the Secretary of the Department of Homeland Security, and the Secretary of the Treasury on all matters involving the commercial operations of CBP and related functions within DHS and Treasury. It also plays an important role in not only improving supply chain security but ensuring that trade is not disrupted in the process. COAC members include representatives from manufacturing, retailing and the high technology sector as well as transportation and logistics. Formalizing a government-industry relationship can benefit both parties.

10. Due to current import requirements, the Import License (LI) process has to be initiated at least two months in advance. This requirement has an adverse impact on planning. The long lead times deny importers the flexibility to meet the demands of customers.

11. A frequent source of frustration is the multiplicity of agencies involved in the course of supply chain operations. There is no clear chain of command, no lead agency operating across the entire logistics chain, which creates confusion and parallel processes and paths.

12. Current procedures preclude cargo clearance until all taxes have been paid and proof is submitted to the state (fazenda) in hard copy format. The continued requirement for hardcopy documentation is counter to the efficiency of an automated system.

13. A common concern is the apparent imbalance between export and import processing requirements. There is a perception that much more focus and energy/effort is put into the facilitation of exports while far more stringent requirements are imposed on the import process.

14. Brazil says it has the policy of involving the private sector in making changes but at the same time is reluctant to involve companies in the solution. The more successful changes to import and export systems are those where the trade has made a significant contribution to thethinking, planning and deployment of the systems. SAFE Framework developers

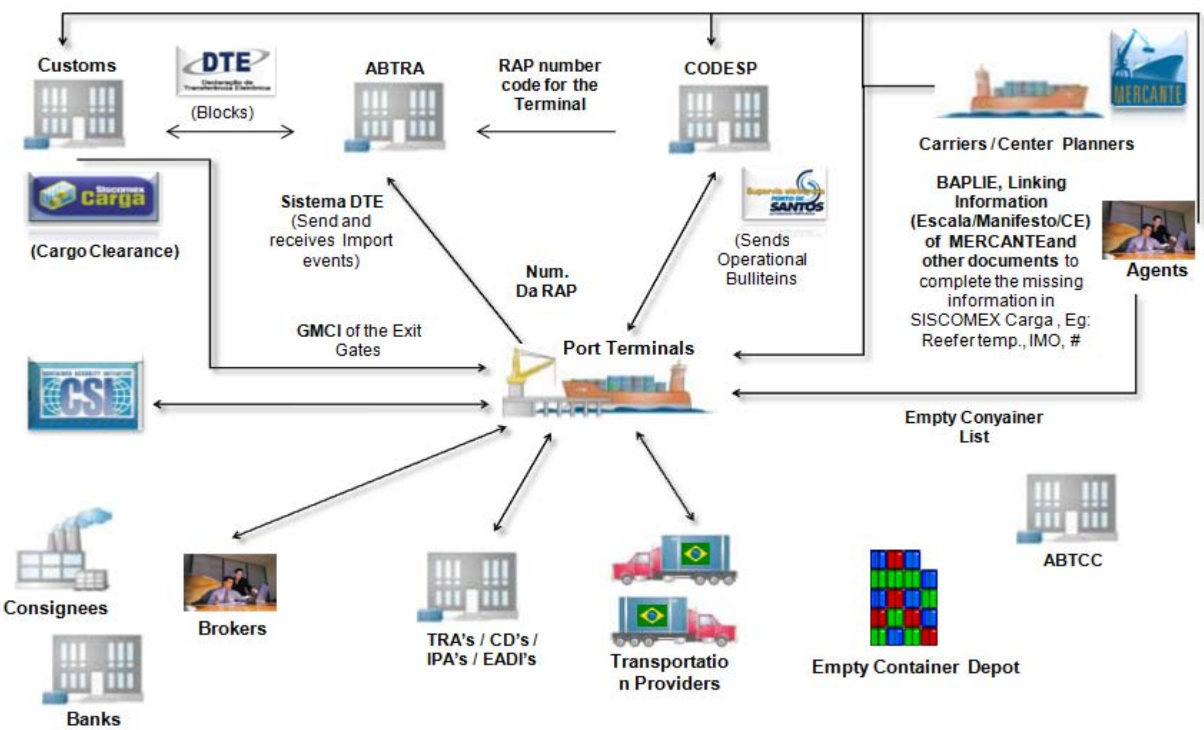
understood this approach and created a private sector consultative council to provide advice to the Policy Commission and the High Level Working Group.

Technology & Information Exchange

The following are the findings of the Unisys Team as they relate to the area of technology deployment and exchange of information between all logistics chain participants currently present in the import, export and cabotage logistics chain operations, systems and local port requirements

1. Significant progress has been made in optimizing existing manual and semi-automatic processes and procedures. Aligning current documentation with automation for the "back room" work has made a significant difference. Building from the basic services up to the more sophisticated processes has allowed the federal government and logistics chain partners to better understand the requirements and provide the necessary training to implement them. This progress should be encouraged and supported to ensure continued development. A logical next step would be to establish sound policies and procedures for the declaration and clearance of cargo, together with the use of technology as an enabler.

2. Currently there exist many concurrent systems that the logistics chain partners need to utilize to move containerized cargo through the logistics chain. These systems are either not integrated or are not synchronized on a single platform so as to enable a dynamic logistics chain. Shown below is a typical systems/entity map of all the relevant touch points in enabling the importation of containerized cargo into Brazil.



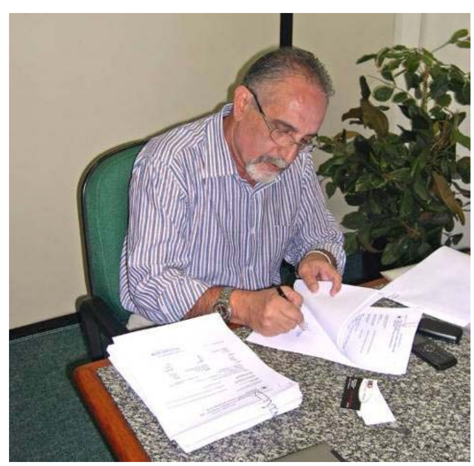
3. Receita Federal do Brasil requires that Shippers and their representatives utilize the SISCOMEX systems to declare and clear cargo. These systems include SISCOMEX Import, Export, Carga and Transito. All four SISCOMEX systems are based on different technology platforms and hence require a different Standard Operating Procedure from each of the logistics chain participants, some of which utilize all these systems concurrently. In addition to confusion and inefficiency, the lack of a single platform increases costs by requiring additional training investment to ensure personnel are qualified in multiple systems or by hiring additional personnel dedicated to the support of specific systems. For example, SISCOMEX Carga was deployed in early 2008 as a standalone system rather than being included as a module within the SISCOMEX platform.

4. Similar to Receita Federal, other federal and state government agencies require the use of their own individual systems to declare and clear cargo, and for payment of taxes. This process contributes to the layering of bureaucratic levels and its inherent inefficiencies and costs.

5. Notification of container presence is inconsistent – sometimes as much as 5 days elapse before the importer knows the container has arrived. This uncertainty and delay adversely impacts business operations such as just-in-time inventory models.

6. Users cannot make direct data inputs to SISCOMEX Carga. Instead, another system, Mercante, is interjected between the user and the controlling program. Layering of software programs adds to the complexity of the process and increases personnel training costs.

7. Although efforts are being made to reduce or eliminate the generation of paper documents, many examples remain of redundant practices. The process for clearing cargo from the discharge terminal currently requires that paper hardcopies (6 copies) have to be submitted in person to different locations. This paper-intensive process is inefficient and time-consuming, adding to the cost and time required to accomplish this fundamental task. This documentation set being signed by the customs house broker below includes:
   a) Declaração de Importação (Import Declaration)
   b) Nota Fiscal da Mercadoria (Cargo Fiscal Bill)
   c) Original Bill of Lading
   d) AFRMM (Adicional ao Frete para Renovação da Marinha Mercante – Freight Charge for Renewal of the Merchant Marine) Payment Receipt from DMM (Departamento de Marinha Mercante do Ministerio dos Transportes – Transport Ministry Department of Merchant Marine)
   e) ICMS State Tax Payment Receipt (Imposto sobre à Circulação de Mercadorias e Serviços – Goods and Service Transit Tax);
   f) Certificado de Fumigação (Fumigation Certificate)



8. In the case of an import, some terminals require that tax documentation be submitted to them, so as to verify that all taxes for the cargo have been paid; only then is a pick up scheduled. The lack of consistency in requirements between terminals leads to errors and delays.

9. The SISCOMEX Carga database does not have provision for important container information fields. For example, there is no ability to enter such data as temperature readings for reefers or oversized container data. This important information must be entered in other programs, adding to the layering of software program requirements.

10. Clearance declaration is verified in SISCOMEX Carga by terminal personnel as the basis to load containers. However, the system allows Customs to cancel the load hours after it is already performed. The lack of a firm deadline for altering load decisions introduces major uncertainty and inefficiencies into the system.

11. The calculation of taxes is the responsibility of the shipper or the shipper's representative. However, no standardized tool is included as part of the SISCOMEX platform to facilitate this process.

Public-private Communication and Transparency

The findings listed below address the area of communication and transparency between all the logistics chain participants (public and private) in the import, export and cabotage logistics chain operations.

8. Entities involved in the logistics chain operations have modified their processes and procedures towards automating their core business practices to be more agile in the logistics chain. Development of a single-window management system would alleviate the cost and necessity of developing different proprietary systems to accomplish the same objective.

9. Associacao Brasileira de Terminais e Recintos Alfandegados (ABTRA) is developing a system to integrate the terminals and warehouses in the Port of Santos to a single database for those needing access to the geography of the port. Some concern has been expressed as to how this system will interact with existing Receita Federal do Brasil systems. For example, questions include whether these systems will be integrated to form a single window system and whether they will have application outside the Port of Santos.

10. The impending adoption of Porto sem Papel is being viewed with some apprehension as to whether it will constitute a step forward or simply be yet another system adding to the already crowded field. Across the entire logistics chain, a commonly expressed concern pertains to the confidentiality of business data. The safeguarding of proprietary and confidential information is a high priority in virtually all business models. Currently, businesses have misgivings about information sharing out of concern that confidential data on value or production may end up with a domestic competitor. This anxiety over data security acts as a barrier to seamless and secure information exchange between all relevant parties.

11. REDEX is widely regarded as a positive development, providing a streamlined method for cargo export declaration when physically present at a customs bonded facility. This process extends the jurisdictional borders of Receita Federal do Brasil beyond the maritime terminal facilities and assists in the capacity building efforts of Brazilian ports like Santos that are running out of space. There is no such provision for imports, which are not allowed to leave the maritime terminal facilities without clearance from Receita Federal. There appear to be no plans for a “REDIMP” program.

12. With the advent of Porto sem Papel, a common question is whether Receita will continue to require physical Import and Export declarations to be delivered at the Customs office. If this will continue to be a requirement, it would seem to be counter to the expressed aims of the Porto sem Papel concept.

13. Level of information shared by Federal government agencies with logistics chain partners was found to be less than required. The lack of basic understanding and requirements of the key systems needed to import or export containerized cargo was found to be lacking. To address this specific need, the Unisys Team put together the following table based on our limited understanding of the current logistics system environment in Brazil

Systems	SISCOMEX Importação	SISCOMEX Exportação	Siscomex Carga Carga	MERCANTE
Owner/s	Receita Federal do Brasil	Receita Federal do Brasil	Receita Federal do Brasil	Departamento do Fundo de Marinha Mercante (DEFMM) and Ministério dos Transportes.
Users	• Importers • Customs Brokers • Port Terminals • SRF • SECEX • MDIC • BACEN • DEFMM	• Importers • Customs Brokers • Port Terminals SRF • SECEX • MDIC • BACEN • DEFMM.	• Vessel Carriers • Port Terminals • SRF • DEFMM	• Vessel Carrier; • Port Terminals; • Alfândega; and Ministério dos Transporte

Systems	Importação	Exportação	Carga	MERCANTE
Purpose	Receive Presença de Carga; Generate Declaração de Importação (DI); Generate da Licença de Importação (LI); and Parametrized information.	Receive Presença de Carga; Generate Declaração de Importação (DI); Generate da Licença de Importação (LI); and Parametrized information.	Receive all the information of cargo shipping has to be carried, including cargo and empty containers; Generate Número Identificador de Carga (NIC), and Registration docking and undocking of ships by the Port Operator.	Systematize the processing of information from the transport of cargo by sea, Automating the collection of AFRMM and improve the performance of the Regional Units from the establishment of mechanisms for automatic control.
Deployment Method	Stand Alone	Stand Alone and Web	Web	Web
Costs	• R$ 30.00 per ID • R$ 10.00 for items of merchandise added to the ID, with proportionally inverse rates depending on volumes added: • up to 2 additions - R$ 10.00 each • 3 to 5 additions - R$ 8.00 each • to 10 - R$ 6.00 each • 11 to 20 - R$ 4.00 each • 21 to 50 - R$ 2.00 each; and • 51 or more - R$ 1.00 each.	--	--	--

Systems	SISCOMEX Importação	SISCOMEX Exportação	Siscomex Carga	MERCANTE
Benefits	• Facilitates the tax authorities in the control of imports • Assists in the documentation, accountability and procedures in foreign trade • Informs the importer on the status of the shipment	• Facilitates the tax authorities in the control of export • Assists in the documentation, accountability and procedures in foreign trade, • Informs the exporter on the status of the shipment	• Integrated control over handling in special customs regime • Inform logistics chain partners before the vessel arrival in the customs territory.	• Records loading and unloading data at national ports in advance • Processes AFRMM payment by direct debit on current account
Go-Live date	January 1997	September 1992	March 2008	
Dependency	--	--	Mercante	--

As indicated above, this list is by no means inclusive of all issues affecting the secure and efficient operation of supply chains in and out of Brazil's ports. It is indicative of those issues various supply chain partners believe should merit further investigation and possible modification. This phase of the study served to identify areas for additional research – no attempt has been made to offer solutions or recommendations at this point. It is anticipated that additional issues will surface during this process which will be included in future analysis. This information will serve to guide the Unisys team in carrying out the development of the To-Be solutions in Phase 2 of the Intelligent Cargo and Intelligent Network Port Logistics Chain project.

3.2 Phase 2 - Defining the Intelligent Cargo and Intelligent Network Logistics Chain

The primary task of the Phase 2 of the Intelligent Cargo and Intelligent Network Port Logistics (ICNCP) project was to design a To-Be solution and summarize the proposed process changes and new technologies superimposed onto the current business processes and technologies, of the export logistics chain.

During this phase, the Unisys Team evaluated current state-of-the-art cargo monitoring technologies and systems for application into the Export Logistics Chain in Brasil, identified and assessed systems, and communications best practices and procedures for intelligent cargo and logistics networks, defined and mapped a potential port logistics chain in an intelligent cargo and network environment, identifying processes that would be eliminated or changed as well as new processes that would enhance supply chain visibility, collaboration, or security, identified benefits of the intelligent cargo and intelligent network port logistics chain to the various stakeholders, and identified barriers for the implementation

In order to validate the To-Be design and acquire feedback, the Unisys Team conducted workshops with key export logistics chain stakeholders from June 2 to June 10, 2010. The logistics chain stakeholders that participated in the workshops were carefully selected to be as representative as possible of entities involved in the movement and processing of Export Containerized cargo from Brasil. The schedule of the stakeholder workshops is shown below:

#	Role	Entity/ Stakeholder	Date
1.	Brasilian Federal Government	CAMEX	May 21, 2010
2.	• Terminal Operator • Logistics Provider	LIBRA TERMINAIS	Jun 2, 2010
3.	• Inland Drayage Provider • Container Stuffing Location • REDEX Facility	S.Magalhães Logística em Comércio Exterior	Jun 4, 2010
4.	• Container Shipping Line • Container Shipping Line Agent • Empty Container Depot	CSAV www.saam.com.br saam	Jun 7, 2010
5.	Maritime Industry Associations	FENAMAR sindamar	Jun 7, 2010
6.	Industry Association	PROCOMEX	Jun 8, 2010

#	Role	Entity/ Stakeholder	Date
7.	• Logistics Provider • Customs Broker • Freight Forwarder	Indaiá logística internacional	Jun 9, 2010
8.	• Shipper/ Exporter • Shipper/ Importer	MC Mineração Curimbaba	Jun 10, 2010

Table: To-Be Solution Workshop Schedule

These interactive workshops/ discussions were executed so that Unisys Team could:

- Provide the stakeholders with an update on the ICNCP project
- Share the high level To-Be design and provide visibility to the stakeholder community
- Conduct a To-Be Design walkthrough
- Communicate the benefits of the ICNCP To-Be design
- Listen to issues the stakeholders might have
- Address the concerns of the stakeholders
- Provide clarifications to the stakeholders
- Acquire and document stakeholder feedback
- Get high level buy-in for the ICNCP To-be design from the stakeholders

The table below represents the comments, concerns and recommendations shared by the logistics chain stakeholders and validated by the Unisys Team:

Feedback - Issues/ Concerns			
Stakeholder	**Control Point**	**Focus Area**	**Feedback**
Grupo Libra	TO	BP	Inspection process (work flow pallets, physical inspections)
Grupo Libra	TO	SIIE	Possibility to receive UN/EDIFACT (CODEGO = Gate Transactions) etc.
Grupo Libra	TO	BP/SIIE	Need to have visibility to containers being scheduled when delivered to Container Discharge Terminal
S. Magalhães	CD	BP	Booking is not always done after filing the NF-e
S. Magalhães	CM	CMM	AutoTrack could be used to Tracking the trucks.
CSAV	CD	BP	The booking information could be integrated with Pre-Plan.
Fenamar/ Sindamar	CM/CS/TO	EBP	Who is going to do maintenance and secure the RFID environment?
Fenamar/ Sindamar	CD	SIIE	The ICNCP API will put together all information so it is going to help a lot all the entities involved making the processes better organized. (Less costs)

Feedback - Resolution/ Suggestion to Resolve Issues/ Concerns			
Stakeholder	**Control Point**	**Focus Area**	**Feedback**
Grupo Libra	TO	SIIE	Integration with Appointment System
S. Magalhães	CD	BP	ICNCP API needs to be flexible to accept Booking or NF-e

Feedback – Other Issues and Concerns			
Stakeholder	Other Points	Focus Area	Feedback
CSAV	Porto Sem Papel	OTH	A lot of data must be enter but they are already in another system (redundancy) like SIXCOMEX, MERCANTE and etc.
CSAV	Porto Sem Papel	OTH	No big benefits for them
CSAV	Porto Sem Papel	OTH	No visibility and no reciprocity
CSAV	Porto Sem Papel	OTH	Low cost benefits
CSAV	Porto Sem Papel	OTH	Recreating the system
CSAV	Porto Sem Papel	OTH	Takes 30 min to fill up all the data in the Porto Sem Papel system and when 15 min pass it resets.

Legend:

Ctrl. Pt.	Control Point		Focus Area	Focus Area
CD	To-Be Container Demand		EBP	Enhanced Business Process
CM	To-Be Cargo & Container Movement		CMM	Cargo Monitoring Mechanisms
CS	To-Be Container Stuffing		SIIE	Systems Integration & Information Exchange
ICM	To-Be Inland Container Transportation		OTH	Other
TO	To-Be Terminal Operations			
VM	To-Be Vessel Movement			

The feedback summarized below represents the comments, concerns and recommendations shared by the logistics chain stakeholders and validated by the Unisys Team:

ICNCP Best Practices/ Business Process Enhancements

The business process enhancements recommended by the ICNCP To-Be Design need to:

1. Be based on Industry best practices with low footprint on existing operations
2. Take into account all levels of stakeholders from integrated, high technology enabled operations to small mom and pop outfits
3. Include fail-safe mechanisms that include manual procedures in case the technology solutions fail

Cargo Monitoring Mechanisms

The Cargo Monitoring Mechanisms recommended by the ICNCP To-Be Design need to:

1. Run on an open frequency such as the 860-960 MHz frequency, opened by ANATEL
2. Be sensitive to all the kinds of container stuffing operations and not inhibit existing operations
3. Cost less that $10 per shipment
4. Seamless into the existing technology infrastructure
5. Be able to be used by Logistics Chain stakeholders using very basic training

Systems Integration and Information Exchange

The Systems Integration and Information Exchange recommended by the ICNCP To-Be Design need to:

1. Be able to integrate disparate data sources seamlessly
2. Flexible to take into account the exception processing in current Export Logistics operations
3. Standards based or open source based
4. Cannot be cost prohibitive including the infrastructure costs for the Export Logistics chain

Shown below is a high level schematic of the long term benefits of the ICNCP To-Be Solution design if it is deployed in an integrated fashion with the right public and private entities involved in the long term deployment.

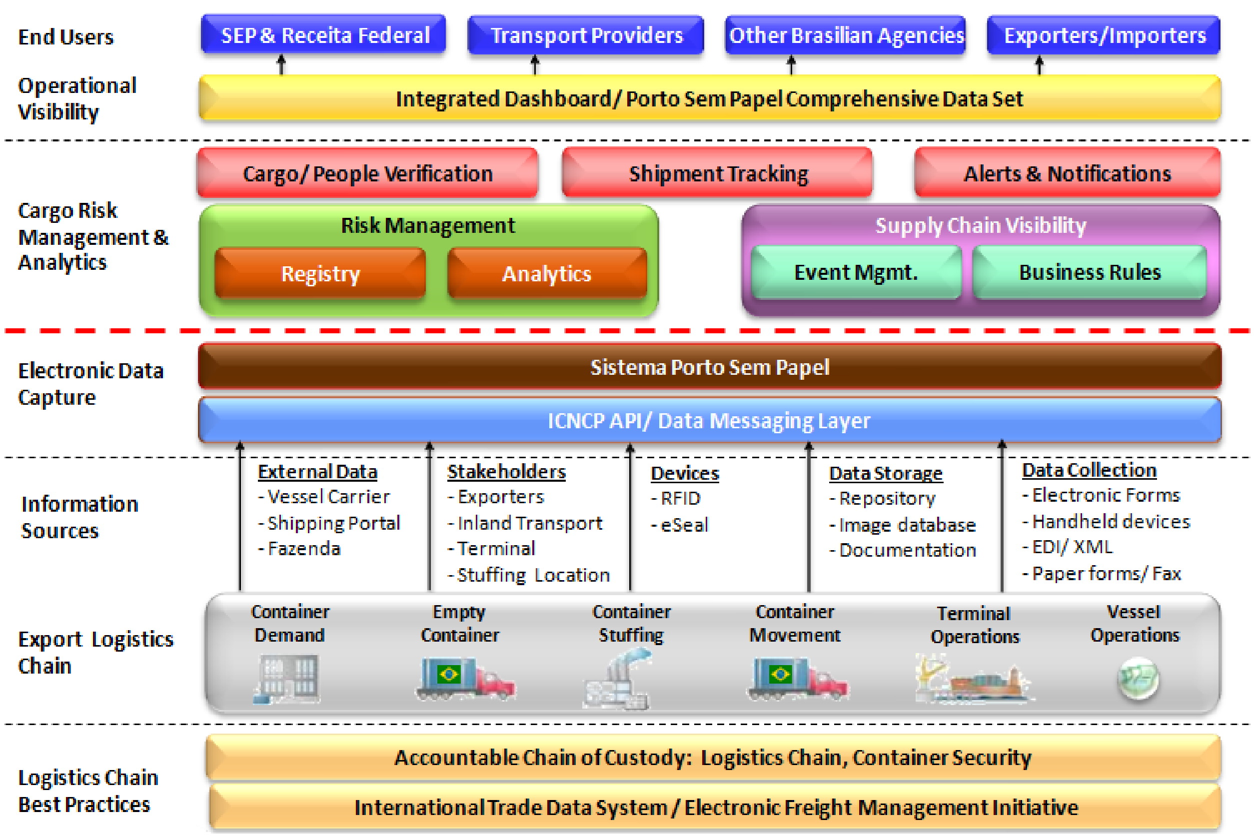


Figure: Long term vision of the ICNCP To-Be Solution design

Overall
In summary, the ICNCP To-Be Solution has been well received by the industry stakeholders and all of them seemed excited to be asked to participate in this strategic project.

Going forward the Unisys Team plans to set up follow up with each of the stakeholders to participate in the next phase of the project.

3.3 Phase 3 - Assessing the Impact of an Intelligent Cargo and Intelligent Network Port Logistics Chain

Each year, millions of commercial shipments enter or leave Brasilian ports for other countries, constituting a potentially serious cargo tracking and logistics challenge. Commercial transportation is a key driver of the economic structure of Brasil, so the ability to leverage existing intelligent transportation systems (ITS) technology provides a solid foundation for accelerating Brasil's initiatives in cargo and container tracking.

The problem of securing freight transactions – and specifically containers leaving Brasil's ports – has become critical. The following list highlights just some of the current obstacles at Brasilian ports:

- Containers are not detected and identified before they reach the port.
- The port authority is unable to track or monitor the movement of all containers.
- Containers are not preprocessed on a 24/7 basis before they arrive at the port.
- There is no avenue in place to allow low-risk containers to move swiftly through the system.
- High-risk containers cannot be identified and sorted for additional inspection.

Specifically, freight containers entering Brasil's borders from high-risk trade gateways, such as intermodal freight yards, rail yards, and land and sea ports of entry, must be detected, identified, and screened/sorted by risk for processing, and the following information must be monitored:

- Where was it loaded?
- Who shipped it?
- When was it shipped?
- Where is it now?
- Was it sealed?
- Was the seal tampered with?
- If so, where?
- What should be in it?
- How, when, where, and by whom was it inspected?

This is critical information that must be gathered, analyzed, and shared with the trade regulatory agents in Brasil at the source of the freight transaction. Chain of custody records that will include sufficient information to identify who had possession of the freight throughout every step of the trip from origin to destination, when and where the freight was transferred, the status of the container and seal at each hand off, and a measure of the travel times between trade gateways.

Even though trade facilitation and security regulation are at opposite ends of the spectrum, these dual functions depend on information sharing and the breaking of institutional barriers to guarantee a successful implementation. Deployment of new processes and state-of-the-art management technologies are key steps to improve the performance of the port logistics chain, in order to minimize interruptions to the flow of cargo through the chain.

Introducing the ICNCP project into Brasil's logistics operations would have a material impact on the country's commerce as it would reduce transportation costs. It would also decrease shipper inventory carrying cost as improved information can be provided to the shipper.
Investment in technology would also stimulate economic activity in Brasil's less developed regions. Much of Brasil's economic base is confined to the coastal regions in the Southern regions of the country. Technology would stimulate economic activity and development in the interior regions and the country's northern states, which today suffer the most from Brasil costs. This would be consistent with infrastructure investments being made to improve access to the interior.

Overall, the ICNCP project would facilitate a reduction in transportation costs. Brasil is a vast country of3.3 million square miles. It has significant human and natural resources, and a broad industrial base. It has significant market potential, both internally and externally. Unfortunately, Brasil has not been able to capitalize on its resource base. Historically, a limited, congested logistics network has hampered the movement of cargo within the country and has introduced necessary costs to supply chains involving Brasilian products. The impeded freight flows and excessive shipping costs are commonly referred to as "Brasil costs."

3.4 Phase 4 - Development of an Implementation Strategy

The primary task of the Phase 4 of the Intelligent Cargo and Intelligent Network Port Logistics (ICNCP) project was to develop an Implementation Plan for the Field Test (Pilot) deployment of the ICNCP project. In developing the Implementation plan, the Unisys Team took into consideration the following:

- The deployment of an intelligent cargo network into Brasil’s logistics operations would materially impact the country’s commerce by improving capacity and reducing transportation costs.
- The ICNCP project would decrease shipper inventory costs by providing more accurate and timely information to the shipper about cargo movement.
- Technology enhancements can also stimulate economic activity and development in the country’s interior and the northern states by expediting cargo exports thus increasing the volumes being produced.

It is the hope of the Unisys Team, that with the support of the USTDA, SEP will implement the ICNCP project and once completely and successfully executed the ICNCP Field Test (pilot project) will lead to the following benefits:

- Allow SEP to take the lead on an area of Port Modernization and show SEP in a leadership position

- Allow SEP to evaluate and test solution that is right for industry to showcase what works; what does not work to improve logistics chain operations
- Enhance the logistics chain operations module of the “Single Window” for Trade and Government
- Provide a consolidated / Single review and inspection process for exports by utilizing data available to all including requesting and jurisdictional agencies by providing a standardized, auditable processes that will deliver transparency and accountability to export processes
- Develop / Establish / lay a foundation for preclearance processes for export containerized cargo by testing solutions in real world in Brasil on functioning logistics chains
- Collect Statistical data to develop and share business case with industry
- Present a cost effective business case to the industry for full deployment
- Permit SEP to get consensus amongst all relevant parties
- Develop a platform for future integration with Sistema Porto Sem Papel
- Provide a baseline before setting up mandate to industry in the areas of:
    - Rules/ Guidelines
    - Requirements
- Reduce congestion and free up static and dynamic capacity of ports/terminals

In the long term, the development of new procedural measures and state-of-the-art management technologies will serve to overcome the obstacles currently faced by Brasilian exporters and US businesses doing business in Brasil. This project will be one step to assure the continued and responsible growth of trade between the two countries.