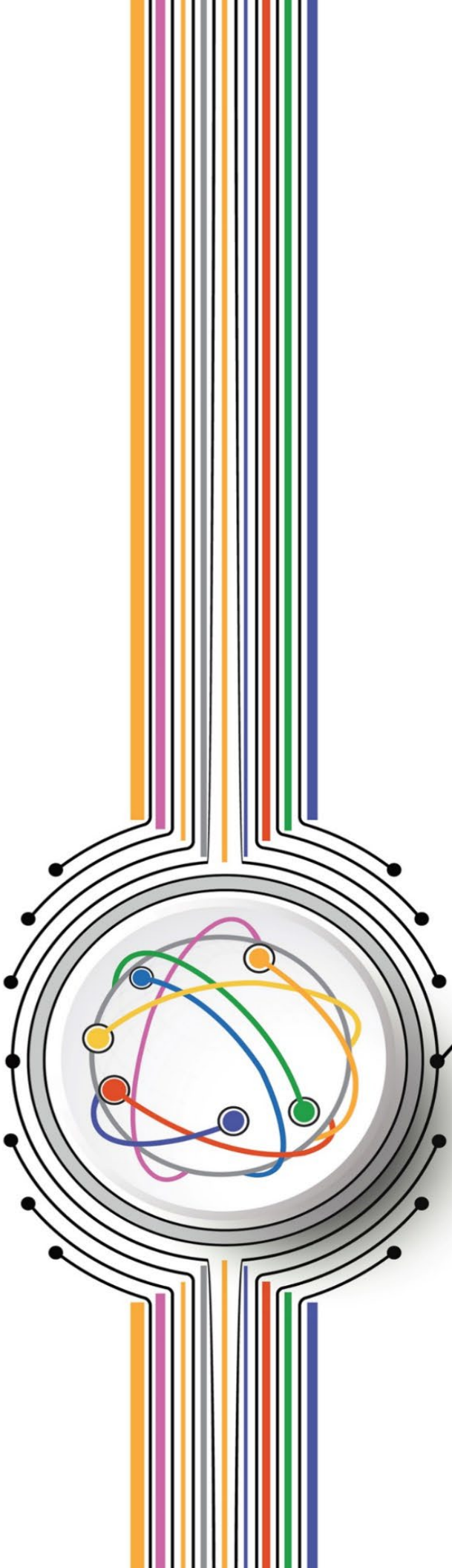

UNECE

White Paper

Guidelines for Establishing a Regional Single Window

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Note

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The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)

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Participation in UN/CEFACT is open to experts from United Nations Member States, intergovernmental organizations and non-governmental organizations recognized by the United Nations Economic and Social Council (ECOSOC). Through this participation of government and business representatives from around the world, UN/CEFACT has developed a range of trade facilitation and e-business standards, recommendations and tools that are approved within a broad intergovernmental process and implemented globally.

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LIST OF ABBREVIATIONS

ALADI	Association Latino-American D'Intégration
API	Application Programme Interface
ASEAN	Association of Southeast Asian Nations
APEC	Asia Pacific economic Cooperation
ASW	Asean Single Window
COA	Country of Assembly
COB	Country of Brand
COD	Country of Design
COM	Country of Manufacture
CoO	Country of Origin
HP / HS	Hybrid Products / Service
IATA	International Air Transport Association
NSW	National Single Window
REC	Regional Economic Communities
RSW	Regional Single Window
SOA	Service Oriented Architecture
UPU	Universal Postal Union
WCO	World Customs Organization
WCO DM	World Customs Organization Data Model

1. INTRODUCTION

The Single Window (SW) concept was introduced under UNECE Recommendation No. 33. It has transformed global trade facilitation by streamlining processes, enhancing transparency, and reducing costs. According to the World Trade Organization (WTO) Trade Facilitation Agreement (TFA) notifications, the adoption of Single Window continues to progress, with over 90 countries recorded as implementers, to varying degrees, of a National Single Window (NSW). Achieving notable success in enhancing trade transparency and reducing administrative burdens, these systems have allowed traders to submit regulatory documents through a single-entry point, thereby minimizing duplication of efforts and fostering compliance with trade regulations.

Despite these advancements, the growing interdependence of global trade networks demands a higher level of coordination and integration. While NSWs address domestic trade facilitation, cross border inefficiencies remain a challenge. Fragmented processes, incompatible data formats, Non-Tariff Barriers (NTBs) and divergent legal frameworks between neighboring countries continue to create barriers to seamless trade.

The concept of a Regional Single Window (RSW) becomes particularly relevant at this juncture. An RSW transcends national boundaries by interconnecting multiple NSWs within a region, creating an environment that simplifies trade procedures across borders. By integrating NSWs, ensuring a seamless flow of goods, standardizing processes, and enabling the secure exchange of data, RSWs facilitate efficiencies that NSWs alone cannot achieve.

The Evolution Towards Regional Integration

The evolution of the Single Window concept has been guided by a structured framework outlined in the UNESCAP and UNECE 'Planning and Implementation Guide'.[1] This framework identifies five incremental levels for the development of a Single Window:

Level 1: Paperless Customs (Development of an integrated paperless customs declaration system).
Level 2: Regulatory Single Window (Integration of paperless customs with other regulatory bodies to issue trade/import/export/transit-related permits and certificates, and other related documents).

[1] Single Window Planning and Implementation Guide (2012), UNESCAP & UNECE)

Level 3: Port Single Window or B2B Port Community System (Extension of the Single Window to serve entire trade and logistics communities within the airports, seaports and/or dry ports).
Level 4: Fully Integrated Single Window Ecosystem (Creation of an integrated logistics digital ecosystem interlinking the administrations, companies and the service sectors to better manage the entire chain of import-export operations).
Level 5: Cross-border Single Window Exchange Platform (Interconnection and integration of NSWs into a bilateral or regional cross-border exchange platform).

As more countries have implemented their NSWs, the emergence of the Level 5 "Cross-border Single Window Exchange Platforms has now been prevalent. Several regional initiatives have been launched to facilitate trade within specific regions by integrating their NSWs. This regional integration enhances the efficiency of cross-border trade, offering a compelling opportunity for further efficiencies through the integration of NSWs in a regional context. The concept of RSW has emerged as a powerful tool to simplify and harmonize trade processes within a region or economic bloc.

However, it is essential to recognize that a different approach to **Level 5** is now possible, driven by advancements in decentralized technologies such as Web3.0[2] and AI[3]. This approach moves away from a centralized architecture toward a decentralized model, where each actor can continue presenting their trade documents in their preferred format while achieving full interoperability through smart contracts and AI-driven data exchange. To ensure practicality, this model should be piloted in parallel with traditional RSW implementations, with clear governance frameworks to address data sovereignty and interoperability challenges.

The UN/CEFACT Technical Note on Terminology for Single Window highlighted that a Regional Single Window (RSW) would be a mechanism that would handle trade-related regulatory requirements within a given region or special grouping. This would either create a collaborative system of NSWs (a network of networks) or provide additional levels of functionality.[4] As a prerequisite, there should be an existing protocol or agreement among member states which facilitates regional integration and the exchange of cross-border data among the members.
Some examples of similar regional implementations of Single Window and other projects that facilitate regional exchanges include:

[2] Web3 is the next generation of the decentralized internet technologies like blockchain
[3] AI stands for Artificial Intelligence
[4] UN/CEFACT, Technical Note Terminology for Single Window And other ePlatforms: https://unece.org/fileadmin/DAM/cefact/GuidanceMaterials/WhitePapers/WP-TechNoteSWTerminology_Eng.pdf

ASEAN Single Window (ASW)

One of the earliest examples of a regional SW is the ASEAN Single Window (ASW) adhered by 10 member states through the Protocol to Establish and Implement the ASEAN Single Window (ASW Protocol) in 2006. The ASW was officially launched on 1 January 2018. The ASEAN Single Window is defined as "the environment where National Single Windows of Member Countries operate and integrate", which is congruent to the RSW mentioned in UN/CEFACT Technical Note on Terminology for Single Window v1. The ASW has successfully integrated multiple countries' systems to facilitate seamless trade. All ASEAN Member States (AMS) were exchanging live data using the e-ATIGA Form D (since 2018), which is the electronic version of the ASEAN Trade in Goods Agreement Certificate of Origin. This system also includes the ASEAN Customs Declaration Document (2020), which AMS were utilizing for risk management purposes and more recently incorporated the ePhyto certification (2022).

Pacific Alliance (PA) Integration

A similar initiative was launched by the Pacific Alliance, which is a regional integration initiative comprising Chile, Colombia, Mexico and Peru, aimed to implement free movement of goods, services, capital and people between and among its members. The Pacific Alliance established Interoperability of the Foreign Trade Single Windows in the Pacific Alliance. The Pacific Alliance has made significant progress in improving interoperability between their Single Window systems, incorporating the exchange of ePhyto certificates with Uruguay in 2020. This includes addressing legal challenges and enhancing technical infrastructure to support electronic documents and signatures. The PA focuses on aligning procedures and data requirements among member economies highlights the complexity and importance of regional collaboration.

It should be noted in this implementation, defining Spanish as a common language for all countries made the overall project smoother compared to having many different languages. It cannot be underestimated the importance of semantics within multiple country implementation.

European Union Single Window Environment for Customs

The European Union (EU) has agreed to develop a Single Window environment to enhance the efficiency of customs procedures across its member states. This system will allow for the electronic submission of customs declarations and other regulatory documents through a unified interface. It aims to streamline processes, reduce administrative burdens, and improve the overall efficiency of cross-border trade within the EU. The EU Single Window Environment integrates various national systems, ensuring that traders can submit information once and have it automatically distributed to all relevant authorities across the member states.

Inter-American Network of International Trade Single Windows (RedVUCE)

The Inter-American Development Bank (IADB) launched in Oct 2011 the "Inter-American Network of International Trade Single Windows (RedVUCE)" as a regional forum for dialogue and cooperation between governmental, public and private organizations. RedVUCE seeks to strengthen coordination, cooperation, and alliance between the NSWs of the region, and other relevant actors, in order to combat illicit activities and enhance security throughout the logistics chain[5].

APEC's Regional Single Window Interoperability (SWSII)

Similarly, the Asia-Pacific Economic Cooperation (APEC) is actively promoting Single Window Systems' International Interoperability. In May 2016, APEC Ministers Responsible for Trade agreed on the Initiative on Single Window Systems' International Interoperability (SWSII), as a step towards digitally transforming regional trade amongst members. Towards this end, APEC members had proposed the APEC SWSII Action Plan to promote and advance the interoperability of NSWs within APEC.[6] APEC economies are working towards SWSII, focusing on key areas such as integration of security, privacy, and risk management. The success factors identified so far include developing effective policies and enabling solutions that foster trust through security technologies and legal frameworks. These efforts are designed to facilitate, secure and promote efficient information exchange across borders.

These regional projects illustrate how collaborative efforts among multiple countries can and could enhance trade facilitation, reduce administrative burdens, and improve cross-border regulatory processes' efficiency.

[5] UNECE, Pacific Alliance Single Window - Isabel Mejia: https://unece.org/trade/documents/2025/01/presentations/pacific-alliance-single-window-isabel-mejia

[6] APSEC, Supply Chain Integration 4.0 through APEC Single Window Interoperability Action Plan: https://www.apec.org/docs/default-source/publications/2019/12/2019-cti-report-to-ministers/toc/appendix-4---supply-chain-integration-40-through-apec-single-window-interoperability-action-plan.pdf?sfvrsn=6937880a_1

2. OBJECTIVES OF A REGIONAL SINGLE WINDOW (RSW)

The Regional Single Window (RSW) represents a possible significant advancement in trade facilitation, evolving from the need for enhanced regional integration, collaboration and coordination beyond the capabilities of NSWs. Throughout this document, the definition of NSW as it described in Recommendation No. 33 will be kept. While NSWs have optimized trade within their respective countries, regional cooperation becomes imperative to address broader facilitation objectives as explained in the introduction of this paper. Hence, the launch of RSWs within respective contexts emerges as a strategic imperative.

2.1 Key Objectives of an RSW

The key objectives of a Regional Single Window (RSW) are as follows:

- **Facilitate cross-border trade:** Simplify and harmonise trade procedures across borders, reducing administrative burdens and processing times.
- **Enhance regulatory efficiency and compliance:** Improve the efficiency and effectiveness of regulatory controls by standardizing and harmonizing data, as well as streamlining processes across participating countries. This includes reducing duplication of efforts and ensuring consistency in the regulatory implementation phase.
- **Promote economic integration:** Support the growth of regional trade by fostering closer coordination among member states. This includes facilitating free flow of goods and services within the region, thereby enhancing regional economic growth and competitiveness.
- **Reduce Time and Costs:** Minimize the time and costs associated with trade transactions by automating and digitizing procedures. This includes reducing the need for physical documents and enabling faster processing times for customs and other regulatory approvals, avoiding, among other problems, the need to re-enter the same information in different agencies.
- **Support Risk Management:** The RSW can facilitate the sharing of information and intelligence, serving as the first step in enhancing regional risk management capabilities. By providing a comprehensive view of trade activities across the region, it enables better identification and mitigation of potential risks, such as fraud or illicit activities.
- **Foster Collaboration and cooperation Among Stakeholders:** Promote collaboration among trade-related government agencies, private sector entities, and international organizations. This includes establishing clear communication channels and cooperative mechanisms to address any issues that may arise in RSW implementation and operation.

These objectives aim to create a more efficient, transparent, and secure trade environment, ultimately contributing to the economic development and integration of the participating region.

2.2 Framework for Establishing an RSW

This document provides a structured approach by outlining **four** dimensions for establishment of RSW:

1. Governance, Legal, and financial framework.
2. Cross Border Data Exchange framework.
3. Technical Capabilities Assessment.
4. Public Awareness and Stakeholder Engagement.

The different challenges, best practices, and solutions mentioned in this guideline will be categorized according to four RSW dimensions. Although some points may appear in more than one dimension, for the purpose of avoiding repeating the same point in each dimension, we are placing that point in the first or more relevant dimension where the issue should be faced.

These proposed dimensions have the intention of grouping ideas and recommendations in a way that helps to understand when these issues may apply in the process of implementing a RSW.

3. GOVERNANCE, LEGAL AND FINANCIAL FRAMEWORKS

3.1 Governance structure

One of the earliest challenges an RSW project will face will be to gather and understand the needs and requirements for the governance, legal and financial frameworks, and thereafter design, build, test and implement these frameworks.

Establishing the RSW requires a robust governance mechanism to ensure effective and efficient coordination, oversight, and management. The following guidelines, supported by examples from ASEAN, the Pacific Alliance, and the EU, outline the suggested governance mechanisms and structures for establishing the RSW.

Centralized Governance Body: A multilateral governance body (e.g., Steering Committee) should be established, with balanced representation from member states, private sector stakeholders, and regional trade bodies (e.g., RECs). Roles should include:

- Strategic oversight (ministries of trade/customs),
- Technical coordination (IT/data harmonisation working groups),
- Private sector advisory panels to ensure operational practicality.

Example: The ASEAN ASW Steering Committee includes sub-groups for legal, technical, and stakeholders' engagement, ensuring holistic oversight."

Executive Leadership and Management: The governing body should have an executive leadership team responsible for the management and strategic direction of the RSW. This team should consist of experts in at least trade facilitation, customs, supply chain, information technology, ethics and legal affairs. In the Pacific Alliance, executive leadership involves high-level officials from the trade and customs departments as well as other government agencies involved in the supply chain of the member countries, ensuring that the RSW initiatives are strategically managed and effectively implemented.

Technical and Advisory Committees or Working Groups: Establishing technical and advisory committees and/or working groups can provide specialized expertise and support to the governing body. These committees can focus on areas such as trade facilitation, IT infrastructure, cyber security, data governance, data handling ethics, legal compliance, and stakeholder

engagement. Member states of the RSW can assign representatives to the committee or working group.
In the EU, the Electronic Customs Coordination Group (ECCG) and various working groups provide technical and advisory support to the EU Single Window environment, ensuring that technical and regulatory aspects are thoroughly addressed.

Stakeholder Involvement: Engaging stakeholders, including the private sector, trade associations, and other relevant parties, is crucial for the success of the RSW. A private sector advisory board should be established to contribute to technical and operational committees to ensure business needs are prioritized. Dispute resolution mechanisms (e.g., mediation by the Steering committee) must be formalized to address conflicts between member states or stakeholders. ASEAN involves stakeholders through regular consultations and workshops, ensuring that their inputs and concerns are considered in the development and operation of the ASW. The Pacific Alliance also engages stakeholders through public-private dialogues and collaborative initiatives.

Regulatory and Compliance Framework: A comprehensive regulatory and compliance framework within a regional agreement covering legal and policy aspects is necessary to support RSW operations. This framework should include standardized procedures, compliance requirements, and enforcement mechanisms.

Monitoring and Evaluation: Regular monitoring and evaluation are essential to assess the performance, impact and improvement of the RSW. This may include establishing key performance indicators (KPIs), conducting audits, and reviewing processes to identify areas for improvement. In ASEAN, the ASWSC conducts frequent evaluations and progress reviews to monitor the ASW implementation and effectiveness. The Pacific Alliance also emphasizes continuous improvement based on monitoring and feedback mechanisms, which is an excellent practice.

Funding and Resource Allocation: Securing sustainable funding and resource allocation is critical for RSW long-term success and sustainability. This involves identifying funding sources, budgeting, and ensuring that resources are efficiently utilized. RSW might have to consider alternative finance and budget allocation models. Contingency funding should be put in place for unforeseeable events, such as an IT system collapsing from updates or hacking incidents.

Capacity Building and Training: Providing capacity building and training programs for the stakeholders involved in the RSW is essential to ensure effective implementation and operation.

This includes training in new technologies, regulatory changes, and best practice knowledge sharing. ASEAN conducts regular capacity-building workshops and training sessions for customs officials and other stakeholders involved in the ASW. The Pacific Alliance also invests in training programs to enhance the skills and knowledge of its workforce.

Risk Management and Contingency Planning: Implementing robust risk management and contingency planning mechanisms can help mitigate potential risks and ensure business continuity, agility and resilience. This includes identifying potential risks, developing mitigation strategies, and establishing contingency plans for unforeseen events, including cyber incidents and emergency finance as mentioned above.

Transparency and Accountability: Ensuring transparency and accountability in the governance of RSW is vital to build trust and credibility. This involves clear reporting lines, transparent decision-making processes, and regular public disclosures of performance and financial reports. ASEAN promotes transparency through regular reporting and stakeholder engagement, ensuring that all actions and decisions are communicated openly. The Pacific Alliance also emphasizes accountability through clear governance structures and transparent reporting mechanisms.

By following these guidelines and drawing on the experiences of ASEAN, the Pacific Alliance, and the EU, the governance mechanism for establishing a Regional Single Window can be effectively structured to ensure coordination, oversight, and management, ultimately contributing to the successful RSW implementation and operation.

In order to achieve that list of needs for the countries within the RSW group, they must form expert committees or working groups similar to the hierarchy we have described in the earlier part of this section.

The objectives of these working groups are to build mechanisms to direct, manage and organize the project, set and agree on main goals, and time frames, allocate workload and schedule meetings to achieve those goals.

The RSW committee should define both short, medium and long-term objectives for the group, as well as continuous monitoring and management tools to update the baselines and objectives once results are achieved. The RSW committee should also define the process to welcome and engage new participant countries to the group.

RSWs should acknowledge, explore and plan for the realities of participant countries and their

NSWs, as well as consider if they may need a multispeed implementation program to allow participating countries to travel at their own speed due to their internal situations.

3.2 Legal Frameworks

RSW initiative requires a robust and executable legal framework adaptable to the evolving interests of its members to ensure the smooth and effective operation of RSW. The following guidelines, supported by examples from ASEAN, the Pacific Alliance, and the EU, provide a comprehensive framework for the legal aspects of RSW.

Legal Basis and Mandate: The legal foundation of RSW lies in formal treaties or agreements among participating countries. For example, the ASW is established through agreements such as the Protocol on the Legal Framework to Implement the ASEAN Single Window, signed in 2015. This protocol provides a legal basis and mandate for its operation, ensuring that member states are committed to the initiative. The EU's Single Window environment is supported by EU regulations and directives that mandate member states to integrate their customs procedures, ensuring uniformity and legal coherence across the region. Similarly, the Pacific Alliance has made significant progress by creating agreements that support the interoperability of their NSWs, promoting regional trade facilitation.

Harmonization of Laws and Regulations: To attempt consistency, participating countries should harmonize their customs and trade-related laws. ASEAN has worked towards this by standardizing procedures and adopting international standards like those set by the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT). The Pacific Alliance follows a similar approach, aligning their legal frameworks to facilitate smooth and consistent trade operations. In the EU, harmonization is achieved through comprehensive regulations that all member states must implement, such as the Union Customs Code, which standardizes customs procedures across the EU.

Data Protection and Privacy: Protecting the confidentiality and security of trade data is paramount. The EU's General Data Protection Regulation (GDPR) as well as Data Act Regulation sets a high standard for data protection, ensuring that personal and trade data handled within the EU Single Window environment is secure and used appropriately. In ASEAN, legal provisions ensure that data exchanged through the ASW is secure and confidential, with national laws supporting these requirements. The Pacific Alliance also emphasizes data protection, implementing measures to prevent unauthorized access and ensure data integrity.

Electronic Transactions and Signatures: The legal recognition of electronic documents and signatures is primarily at national level. For the operation of RSW, there is a need for cross-border mutual recognition of electronic documents. An example of these is catered in "The Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific (CPTA), a UN treaty. The EU has established the eIDAS Regulation, which provides a common framework for electronic identification and trust services, ensuring that electronic signatures are legally recognized across all member states.

Dispute Resolution Mechanism: The RSW legal framework must include a clear dispute resolution process for conflicts arising from cross-border data exchange, such as discrepancies in LPCO validation or data jurisdiction. This mechanism should involve a neutral arbitration panel with representatives from member states, the private sector, and international bodies like UN/CEFACT.

Legal Framework Review: Continuous review and updating of legal frameworks are essential. ASEAN periodically reviews its legal frameworks to address emerging challenges and technological advancements, ensuring that the ASW remains effective. The Pacific Alliance follows a similar approach, continuously improving their legal structures to enhance interoperability. The EU regularly updates its regulations and directives, adapting to new challenges and ensuring that the Single Window environment remains efficient and relevant.

The establishment of a Regional Single Window needs to be legally sound, ensuring that it operates efficiently, securely, and in alignment with international standards and best practices.

Depending on the form of cooperation and integration level between countries, the following categories of existing legal frameworks can be distinguished:

(i) **Union-level:** Regional cooperation is typically governed by union-wide legislation/agreement and multilateral trade agreements. Member states align their national laws with supranational legal frameworks, which are binding and take precedence over domestic regulations. Customs cooperation is a key area of integration and is often regulated through a unified legal instrument, such as the Union Customs Code (UCC). The UCC establishes a common tariff system, shared customs procedures, and standardized documentation. It enables transparency and streamline processes across member states. National customs systems are integrated into a shared information environment, ensuring mutual trust and smooth electronic data exchange across borders. Examples include the Import Control System (ICS) in

the EU and the Unified Customs System (UCS) in the EAEU. These systems support the implementation of the Single Window, which operates at the first point of entry for imports and facilitates cross-border trade.

The Regulation establishing the European Union Single Window Environment for Customs. Following approximately a decade of pilot projects and four years of planning and negotiation, the Regulation establishing the EU Single Window Environment for Customs became EU law in December 2022. Providing a legal framework to improve information sharing and digital cooperation between EU customs administrations and other government authorities in charge of enforcing non-customs formalities at the EU border (e.g., health and safety, environmental protection, food and product safety, agriculture, etc.), the regulation is designed to facilitate easier clearance of customs formalities by economic operators.

Customs practices in the EU must ensure they do not infringe on fundamental rights to, not limited to, privacy and data protection.[7] A set of electronic services to enable information to be exchanged between the systems of customs authorities, partner competent authorities, and economic operators, the SWE-C will be designed in alignment with EU privacy and data protection law:[8]

Data is kept in the source systems (customs or non-customs) and used only for purposes already established by customs law and industry/sector-specific law.
The EU Customs Single Window Certificates Exchange System (CSW-CERTEX) does not store any data when performing data-processing operations. All the exchanges and transformations take place in real time, triggering the contextual erasure of any data as soon as the processing operations are completed.
The only data stored in the system is a log file indicating that a transmission has taken place, along with the reference numbers of the documents concerned.

[7] Respectively set out in Article 16 of the Treaty on the Functioning of the European Union (TFEU) and Article 8 of the EU Charter of Fundamental Rights. See European Data Protection Supervisor, "Data protection", available at https://edps.europa.eu/data-protection/data-protection_en. See also Peteva, J., "Data Governance and Customs Knowledge Management", presentation to the World Customs Organization (2019). Available at https://www.wcoomd.org/-/media/wco/public/global/pdf/events/2019/picard/data-analytics4_jenia-peteva.pdf.

[8] See European Union, "Data protection", available at https://eur-lex.europa.eu/EN/legal-content/glossary/data-protection.html.

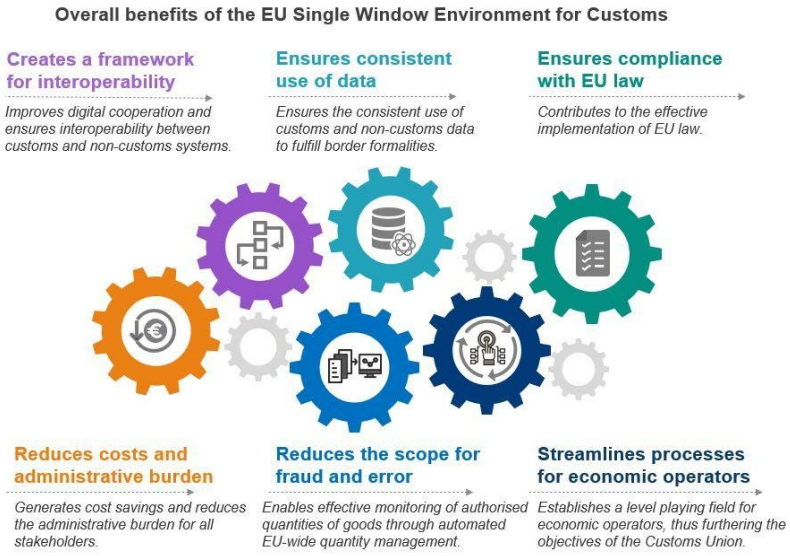


Figure 1- EU Single Window Environment

(ii) **Community/association/alliance-level**: The cooperation is governed by multilateral international treaties concluded by member states. The intergovernmental treaties can cover a wide range of political, economic, security, social and cultural cooperation aspects. Economic growth, integration and the development of the single market are among the main drivers. Countries may not have a community customs code and act based on national legislation following the obligations imposed by Community treaties. The goal is to reduce trade barriers for expedited flow of goods across borders through streamlined and harmonized customs procedures. Each member state has its own NSW integrated with a single standardized Community electronic platform for submitting and processing trade-related documents. It facilitates efficient customs clearance by allowing electronic data exchange among participating countries. Based on signed agreements, the Community Single Window can use a common tariff and product classification system and a single standardized form for customs clearance. Based on legal documents accepted by cooperating countries, the Community members must harmonize their national legislation to comply with the supranational legal instruments. Examples of existing regional economic associations include ASEAN and PA with best practices implemented in ASEAN Single Window (ASW) and the IOPack Platform[9] respectively. Several other best practices in implementing a common regional customs space can be observed in the

[9] https://blogs.iadb.org/integration-trade/en/pacific-alliance-single-windows-trade/

other two trade alliances: the EAC's Single Customs Territory[10] and MERCOSUR's regional integration project.

All three categories assume that the NSW legal framework is fully implemented by countries participating in international trade facilitation agreements. According to Recommendation 35, the NSW legal framework provides a basis for B2G, G2B and B2B environments. Once NSW is implemented, it should already cover electronic commerce including electronic data exchange between agencies and use of electronic signatures at national level. Please see Annexes II and III of Recommendation 35 for reference.

Thus, the legal framework for RSW must take into consideration all elements of NSW legal framework with some additions necessary to ensure communication in the G2G (Government-to-Government) environment. In this respect, it is important to identify the data governance aspects in the context of G2G that need to be addressed in the framework. In particular, the Data Governance model of RSW should consider building a common Risk Data Sharing architecture for the G2G environment.

From a practical point of view, the community/association/alliance level of cooperation is the closest in meaning to the RSW concept since it operates on a regional basis and is less burdensome than the Union level. For this reason, in the next two paragraphs we consider more closely the ASEAN and PA legal frameworks that provide the functioning of their NSWs in the corresponding regions. Then we focus on EAC and MERCOSUR trade alliances. The purpose is to understand how the cooperation between the member states involved in these communities is organized in the legal field.

The **ASEAN** Single Window (ASW) is the environment that connects and integrates the National Single Windows (NSWs) of ASEAN Member States (AMS), thereby allowing the electronic exchange of data between the AMS. The Legal Framework for ASW is based on two documents:

- Agreement to establish and implement the ASEAN Single Window.[11]
- Protocol on the Legal Framework to Implement.[12]

[10] Single Customs Territory
[11] https://asean.org/wp-content/uploads/2020/12/ Agreement-to-Establish-and-Implement-the-ASEAN-Single-Window-ASW-Agreement-1.pdf
[12] https://agreement.asean.org/media/download/20150915020056.pdf

The Protocol's purpose is to supplement and implement the ASW Agreement. It shall be applied to transactions between NSWs within the ASW environment exclusively among AMS. The objectives of the Protocol are declared in Article 3: "This Protocol aims to provide a legal framework for the operations, interactions, and electronic processing of transactions between NSWs within the ASW environment, taking into account the relevant international standards and best practices recommended by international agreements and conventions concerning trade facilitation and modernization of customs techniques and practices".

The **Pacific Alliance (PA)**[13] is an initiative of regional integration comprising Chile, Colombia, Mexico and Peru, officially established on April 28th, 2011. The PA member countries established their NSWs between 2006 and 2013, allowing economic operators to process permits and authorizations from a single website, and, in some cases, to pay fees for foreign trade operations. Trade facilitation between PA member states including cooperation of customs authorities is based among other documents[14] on the Additional Protocol to the Framework Agreement of the Pacific Alliance[15], which includes several essential chapters such as:

- Market Access.
- Rules of Origin and Origin-Related Procedures.
- Trade Facilitation and Customs Cooperation.
- Sanitary and Phytosanitary Measures.
- Technical Barriers to Trade.
- Public Procurement.
- Cross-Border Trade in Services.
- Financial services.
- Maritime Services.
- Electronic Commerce.
- Telecommunications.
- Transparency.
- Dispute Settlement.
- and Exceptions.

[13] About Pacific Alliance: https://alianzapacifico.net/en/what-is-the-pacific-alliance/
[14] Background documents of the Pacific Alliance: http://www.sice.oas.org/tpd/pacific_alliance/Pacific_Alliance_e.asp
[15] Additional Protocol to the Framework Agreement of the Pacific Alliance: http://www.sice.oas.org/Trade/PAC_ALL/Index_PDF_s.asp

This Protocol eliminates tariffs on 92% of goods traded among member countries, but it doesn't impose a common external tariff on imports from non-member countries. Each member maintains its own trade policies with non-member nations. In the Article 5.9 of the Protocol members are required to implement NSW, referred to as VUCE, and enhance it to "guarantee interoperability" between members to "exchange information that expedites trade and allows the Parties to verify the information on foreign trade operations carried out".

According to the Protocol, the interoperability of the VUCE covers the technological, strategic and regulatory aspects, the adoption of international standards and best practices for cooperation between members.

MERCOSUR/MERCOSUL is the Southern Common Market, is a South American trade bloc established by the Treaty of Asunción in 1991 and Protocol of Ouro Preto in 1994: Itis composed of four original member states: Argentina, Brazil, Paraguay and Uruguay. In 2006, it accepted Venezuela as a full member, and most recently, Bolivia. Chile, Colombia, Ecuador, Guyana, Peru, and Suriname are Mercosur/Mercosul's associate members. NCM stands for "Nomenclatura Comun del Mercosur" (Mercosur Common Nomenclature). It is an 8-digit code based on the WCO Harmonized system that defines all goods that circulate in Mercosur countries. The Common Market of the Southern Cone countries' legal framework consists of several documents[16] such as Treaties, Protocols, Agreements and the Protocol relating to Mercosur Customs Code[17].

The **East African Community (EAC)** is a regional intergovernmental organization of six partner states: Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda. The EAC established a Customs Union, which is an integral part of the Community. The customs law of the Community[18] relies on the Community Treaty, provisions of the Customs Union Protocol (main document)[19], regulations and directives of the Community Council, decisions of the Community Court, acts of the Community Legislative Assembly and relevant international law principles. The Community' customs law envisages:

[16] Legal Framework of the Common Market of the Southern Cone: https://www.mre.gov.py/tratados/public_web/ConsultaMercosur.aspx
[17] MERCOSUR Customs Code (protocol): https://www.mre.gov.py/tratados/public_web/DetallesTratado.aspx?id=Q3fTVDNdHPrY%2fWGSfN2PwQ%3d%3d
[18] EAC Key Documents: https://www.eac.int/documents/category/key-documents
[19] EAC Customs Union Protocol: https://www.eac.int/index.php?option=com_documentmananger&task=download.document&file=bWFpbl9kb2N1bWVudHNfcGRmX1FkRGhmVU1uUVlSaVhxWW5ERWpYVkRNRUFDIENVc3RvbXMgVW5pb24gUHJvdG9jb2w=&counter=126

- Introduction of a common external tariff on imported goods.
- Elimination of customs duties and non-tariff barriers to trade between Partner states.
- Simplification and harmonization of trade documentation, customs regulations and procedures (e.g., adopting a standard system of valuation of goods, uniform and comprehensive tariff classification in accordance with internationally accepted standards, the collection of customs duties, temporary admission, warehousing, cross-border trade and export drawbacks).
- Adoption of the Harmonized Customs Documentation and internationally. accepted standards in designing and standardizing trade information and documentation.
- Harmonization of customs nomenclature, adoption of the Harmonized Commodity Description and Coding System.
- Standardization of foreign trade statistics, exchange of customs and trade statistics and information.
- Establishing a customs data bank, among others.

The Single Customs Territory program[20], which is promoted by the EAC, aims to establish the Single Window portal and IT platforms for customs clearance of goods thus facilitating procedures in goods clearance and business transactions across the region. To summarize, it is possible to propose an approximate composition of the RSW legal framework, which is presented in Figure 2 below.

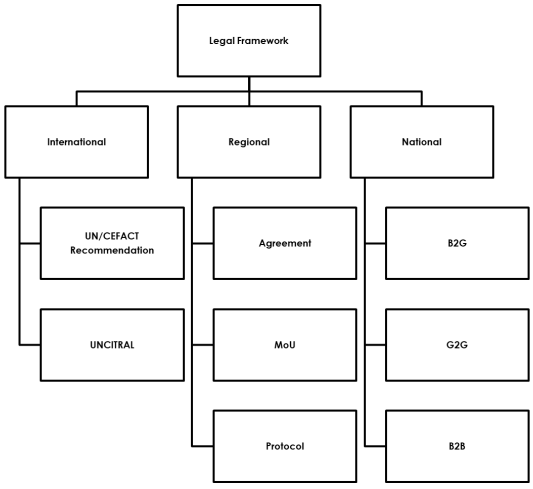


Figure 2 - High-level view of the RSW legal framework[21]

[20] Sixth EAC Development Strategy, 2021/22 – 2025/26: https://www.eac.int/index.php?option=com_documentmananger&task=download.document&file=bWFpbl9kb2N1bWVudHNfcGRmX3NUSkNaVG9lT2FicXhWaGhlUXpDVkRNNlRlIEVBQyBERVZFTE9QTUVOVCBTVFJBVEVHWSgxKQ==&counter=976

[21] B2B - Business-to-business, B2G - Business-to-government, G2B - Government-to-business, and G2G - Government-to-government communication

From the country-level viewpoint, in many cases, the cooperation between neighboring (and other) countries already exists and is based on bilateral agreements (or those between more than two countries). New regional initiatives like RSW consider existing bilateral, regional and international agreements, ICT systems and try to build on top of them rather than cancel by deepening mutual integration of partners.

In this sense, establishing an RSW could contribute to the further development of NSW by introducing new functions to facilitate B2G, G2B and possibly B2B cooperation at the regional (community/association/alliance) level, which avoids excessive implementation costs and provides economic operators with access to new services. In the context of G2G, existing systems could be expected to undergo significant changes in order to meet the requirements of the regional legislation.

In practice, when upgrading the system, the following aspects of the Customs system integrated into the existing NSW should be considered:

- The central point agency (CPA) of NSW, for example Customs authority.
- The type of software - CMS is used to administer customs duties, import taxes like import VAT and import exercise, customs guaranty, various payments including automated enforcement of payment, risk management, postal consignment declarations and risks, VAT refund for foreign citizens (Tax Free), appeals, certificate of origin, customs warehouses permit and reporting.
- The type of SPS (Sanitary and Phytosanitary) documents and their functions. For import and export (when applicable) documentary border checks: SPS health certificates (preferably based on model certificates from Codex Alimentarius, International Plant Protection Convention (IPPC) and World Organisation for Animal Health (WOAH)), for import: Common Health Entrance documents (for animals, animal products for human consumption, animal products for non-human consumption/not for consumption and plant products) for documentary border checks, exchange of information related to import and export between National competent authorities and the NSW CPA and the use of data for automated risk management control.
- Systems for administering of road fees, Common Transit Convention and New Computerized Transit System (NCTS), advance passenger information and passenger record.
- Systems providing information exchange between NSW CPA and other agencies. For example - information exchange between NSW CPA and Customs on permits (some

permits are issued via customs ICT system), Customs administrations of other countries, seaports and port authorities, freight forwarder companies, railway, banks (FATCA, CRS), public registry (property tax return), ministry of health (on pharmaceutical), financial monitoring service (on cash border crossing), ministry of internal affairs and so on.

SIECA. The Secretariat of Central American Economic Integration (SIECA) is the technical and administrative body of the Central American Economic Integration Process, with legal authority under international law. It has functional autonomy, serving as a link for the actions of the other Secretariats of the Economic Subsystem and coordinates with the General Secretariat of the Central American Integration System (SICA).

The SIECA ensures the correct application of the Protocol to the General Treaty of Central American Economic Integration (Guatemala Protocol) and other legal instruments of regional economic integration, as well as the execution of the decisions of the bodies of the Economic Subsystem.

The SIECA digital platforms are categorized into 3 large groups according to the target audience:

- Foreign trade operators.
- Consultation and knowledge.
- Community of the Deep Integration process between El Salvador, Guatemala and Honduras.

The Central American Digital Trade Platform (PDCC) is a transversal axis of the Central American Strategy for Trade Facilitation and Competitiveness (ECFCC), which provides a technological infrastructure hosted and managed by the SIECA, facilitating trade operations and paperwork in the region.

The PDCC is a catalog of online services that has its own characteristics and functionalities, which is why it is considered a Regional Public Good contributing to the improvement of the competitiveness of commerce in Central America.

Additionally, the SIECA provides logistical support to the Customs Union process between Guatemala, Honduras and El Salvador, being the support agency for several projects to support the integration process.

3.3 Financial frameworks

The RSW project entails associated costs that will be essential to the knowledge building, to ensure the project's financial sustainability. This topic will be further explored since it is critical in the early stages of strategic definitions.

Initial Capital Investment

Any large project has a significant initial cost that can hardly be covered with a feed per operation or similar. RSW member countries must understand that the economic benefits will indirectly exceed the initial costs. Therefore, in general, the initial costs of RSW projects are absorbed by member governments, while international development agencies may offer financial assistance to less developed countries.

Financial planning considerations should be given to the expansion policy to subsequent new members, in total or partially. Potential interested parties should contribute equitably to the original members or the project investor; however, this may pose an entry barrier that could limit the RSW expansion. The financial details and requirements must be outlined as policies.

Another challenge that may arise is the criteria used to determine each member's share of costs and investments. This could be proportional to a macroeconomic factor; based on a specific measure which can be adjusted, depending on the economic evolution of each member country. In general, if there is a political union, these decisions will be part of the founding agreements.

Operational Costs

Unlike initial costs, operating costs are directly related to the volume of commercial operations carried out via RSW. In this way, whoever uses the services built in the RSW the most will generate more operating expenses for it.

These operating expenses will also need to be determined by how they are distributed among the members of the RSW so that it is clear to all member countries what the costs involved in participating in the RSW will be. For example, in the Pacific Alliance each country is responsible for the operation and maintenance of its interoperability platform.

Funding Models

Each RSW member country will have to know what the financing model is, in general the initial costs as mentioned before are absorbed by the governments and are generally the sources of initial financing to cover the start of operations. However, in the long term, operating costs are those that will need to be covered.

The sources of financing can be several and complement each other. Primary examples include having a value per operation can be the easiest way to distribute operating costs. These costs can be transferred by each NSW to the private sector, or not according to their own policies. As was presented previously, it must be determined to determine the operating cost, which may be a combination of fixed costs and proportional to the amount of operations carried out. In that case, some factors that more equitably distribute the cost based on some macro-economic indicator can also be considered.

It is important that these definitions are formulated considering relatively smaller economies' needs to prevent eventual entry barriers that limit the RSW expansion.

Another option to consider may be to charge the private sector that wants to offer its services to RSW, in this way whoever thinks that its services may be of interest to the logistics chain. The different NSWs that are integrated into the RSW comply with technical aspects of interoperability and harmonization that allow the private sector to offer standard services such as risk analysis, framework-economic analysis, BI or operational management solutions that meet these standards. Obviously, those who are technically able to offer products or services that comply with these standards and harmonization will have a competitive advantage. RSW could offer their NSW members these services with the technical quality of the solutions offered by private companies.

In this way, a catalog of services and products compatible with the RSW is available, which may be subject to fees and costs to maintain these quality certifications. This can be presented as a good opportunity for public-private cooperation since the private sector is ultimately the objective of trade facilitation.

The standardization and harmonization of services, even in the private sector, is also an indirect consequence of the benefits of RSW implementation. In this way, the entire logistics chain benefits from better prices. Therefore, there is no need to limit the definition of the scope of the RSW to the public sector, and it can then include standardized private services and in this way achieve a sustainability mechanism for the entire project.

Conclusion and recommendations

Referring to existing initiatives on regional integration for trade facilitation and common market development, it is possible to conclude that the foundation for RSW legal framework and financial plan is formed by international, regional and national legislation of the countries located in the region. Best practices in digital transformation, standardization in data exchange, harmonization of customs procedures and trade documentation as well as implementation of paperless systems for trade also should be considered. The availability of the well-functioning NSW in each country is a necessary foundation. The existing cases of RSWs like ASEAN and CARICOM offer community/association-level legal frameworks and best practices of the regional customs union that should be carefully studied and summarized for the sake of developing RSWs.

The community/association-level model of integration assumes a broad spectrum of common interests in the region including RSW. The model seems to be the most appropriate for RSW and is based on treaties signed by all member states that cover various aspects where RSW is one of the cooperation paths integrated in the whole system. In many cases, such a model does not have a common customs code implemented by member states, but it envisages a common tariff on imported goods, common nomenclature and strong commitment to implement advanced exchange of information between customs and other governmental agencies of member states thus enhancing G2G communication (G2G add-ins to NSW).

The Union-level model, with implemented common Customs code, assumes a higher level of legal integration, but this is more complex as it requires huge resources and political commitment. At the same time, some elements of components used by the Union-level model can be adopted by RSW. For example, some elements of CIBM, EU Customs security and safety capabilities are available in the Import Control System (ICS) 2.0.

The RSW should also consider existing bilateral cooperation between countries in the region. Regional legislation should remove legal barriers to the exchange of information between customs authorities (e.g. risk data sharing, statistics data and LPCO). RSW legal instruments must promote harmonization and standardization of domestic procedures in customs, establishing single administrative documents that will replace national declarations, mutual trust in electronic data exchange, adequate data privacy protection and so on. The final composition of the legal framework of RSW requires in-depth discussions with customs practitioners and experts directly involved in the implementation of RSW initiatives.

4. CROSS-BORDER DATA FRAMEWORK

4.1 Regulatory Documents/LPCO

RSWs face a significant challenge when managing the different documents issued by trade regulatory agencies and private businesses. These agencies control and manage their specific interests by issuing declarations and granting Licenses, Permits, Certificates and other types of documents (LPCO) to interested parties. RSW's mission is to support and provide mechanisms for these documents to be exchanged between the different stakeholders in the region to ensure the reliability of the data and its origin.

In this chapter, we will explore different scenarios that the RSW might face. The most straightforward scenario is when an agency already has an information exchange mechanism that has been set by an international standard setting organisation. The ePhyto solution from IPPC is such an example, There is a need to inform and distribute the data contained in the ePhytos among all interested parties and not only among the issuing agencies, and it has to be clear that RSWs are not presenting themselves as direct competitors of the existing mechanisms, rather as the "umbrella" facilitating the cross-border information exchange.

For this purpose, the RSWs must comply with the objectives of this specific exchange platform, (called ePhyto Hub) of the NPPO s and complement them to facilitate both access to the documents issued and the information managed in them.

Another important challenge that RSW deployment currently faces in this matter is the management of the different ways of harmonizing and standardizing the data in these documents. If NSWs adopt different data standards or versions, the RSW would act as a harmonizer between the different NSWs. A very simple example is the identification of entities involved in a trade transaction (e.g. importers, exporters, logistic firms), as these entities can be identified differently by different national agencies or NSWs, the RSW could harmonize the identification via ISO17442 standard - Legal Entity Identifiers, which facilitates precise party identification, smooth processing of interoperable exchanges.

Furthermore, there are several probable cases where there is no processing-oriented data syntax, and LPCO are distributed in the form of scanned images and even in paper format.

In this document the problem is divided into several scenarios to facilitate explanation and understanding, but it is possible that these scenarios will occur in a combined form.

Different scenarios to study are as follows:

1. The NSW involved in the RSW can comply with a data exchange that has been set by an international standard setting organisation such as ePhyto.
2. There is an international data standard (or more than one) available that has been set by an international standard setting organisation, without mandating an interoperability mechanism. For example, guidance from Codex Alimentarius, WOAH and Customs documents CoD,
3. LPCO, where there is no recognized standard of data harmonization, such as Crew list, Passenger list, and Health declarations.

First scenario, where data exchange has been fully set by an international standard setting organisation

In this case, the involved agencies had already gone through a process of harmonization and all the participating government agencies involved in it can exchange between them through this technical facility (hub). Such systems already solve the challenges of exchange data between the agencies and the harmonization has been done by applying the most suitable data model based on the industry's interest. It's the international standard setting organisation together with the specific industry and related agencies who defined, maintained and evolved the specific model to represent their LPCO and the exchange mechanism.

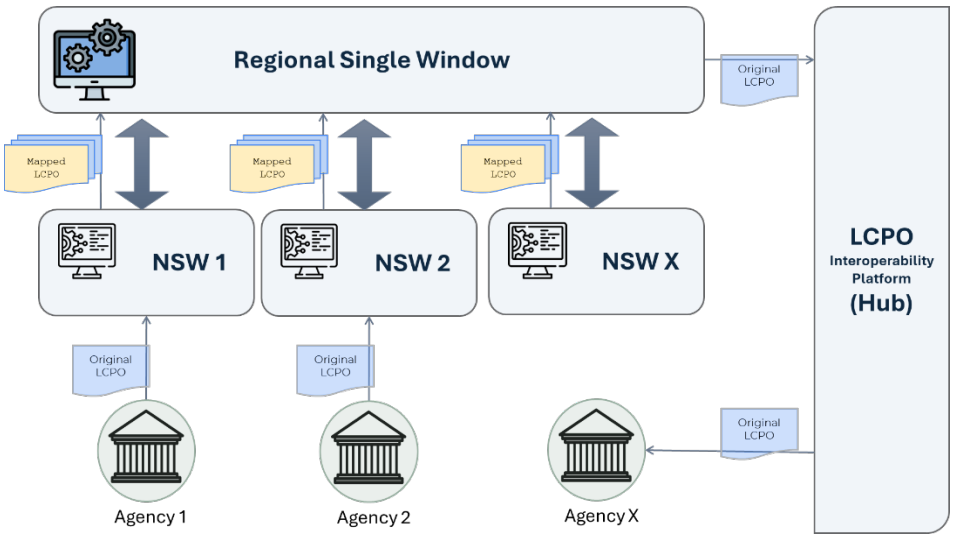


Figure 3 - Scenario One - RSW

In this case, the NSW involved in the RSW act as a national system to support the LPCO Agency to exchange data with other LPCO agencies as set by the international standard setting organisation. In this scenario every NSW involved in the RSW complies with the LPCO specific data exchange without overlapping with it.

A typical sequence of this process may be as follows:

1. A National Agency issuing a new LPCO in the country of origin. This agency itself is not connected to the specific LPCO interoperability platform.
2. The National Agency sends the new LPCO to the NSW in its industry-specific syntax using the exchange mechanism that its local NSW provides.
3. NSW makes the data compliant to the requirements for data exchange with the hub and available for crossing border facilitation. In this way, other stakeholders may benefit from the LPCO data and use it to facilitate its own process. NSW Includes the original LPCO syntax in the map as an additional document object, so the original syntax of the document remains available and will be part of the 'bulk' data available for those who can understand and process the original syntax.
4. NSW exchanges an Inter-gov message including the data mapped and the original LPCO file with the RSW. In this way, RSW can process standard data relevant for the Crossing border controls and keep the original syntax to share it with the destination agency if possible.
5. RSW shares the original syntax with the LPCO specific interoperability platform on behalf of the original Agency.

The following example is provided:
Country A has a national agriculture agency with the capacity to approve and create an ePhyto certificate. This certificate (LPCO) is harmonized using a UN/CEFACT standard that is defined and maintained by the FAO, who is responsible for this specific industry standard.

IPPC has created a specific ePhyto exchange platform called the ePhyto solution that solves in the best of its own interests, the exchange of ePhyto between the subscribed agencies.
But the National agriculture agency of Country A, neither the local NSW has interoperability mechanism to connect their own platforms with the specific industry interoperability platform (IPPC), so in this scenario, RSW can solve the problem for not only Country A but for all the region, creating the mechanism to integrate the IPPC with each of the NSW. In this case, the RSW will act as facilitator and provide the necessary services to reach the goal.

Second scenario. LPCO where there's an international data standard, with flexibility for n interoperability
In this case the LPCO has one (or more) international data standard where it has already been harmonized, and some national agencies or NSW are exchanging LPCO between them.

The LPCO to be exchanged has a specific industry related syntax and harmonization that must not be changed in the exchange process, which means, the LPCO syntax must be sent without introducing changes on it.

In this case the RSW will act as a support to exchange those LPCO keeping the defined data standard of each LPCO.

RSW face the challenge of dealing with different syntax and data standards in all the LPCO exchanged, as may face the problem that the different Agencies are using different data standard of version of the same standard having to be able to interoperate without losing these specific original syntaxes and when necessary, provide the services to migrate from one standard or version to another one.

A typical simplified sequence of this process may be as follows:

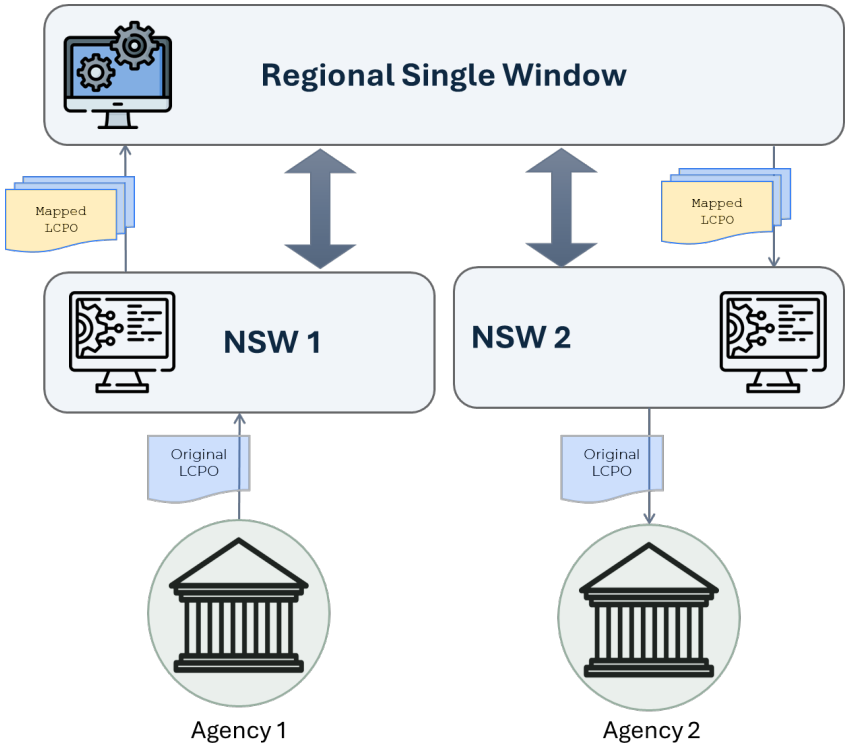


Figure 4 - Scenario Two - RSW

1- 5. Step 1 to 5 are as in the previous scenario, the local Agency creates a new LPCO, sends it in its original syntax and exchanges it with the NSW, who makes the data available for border crossing procedures and makes the data ready for interoperability through
- creating an 'envelope' compliant to the exchange mechanism for NSW in the RSW (IOP?).
- creating an 'ePhyto envelope' for exchange with the Hub.

6. Destination NSW sends the original LPCO in the industry-specific syntax to the destination National Agency.

Some challenges may be presented in the IOP- scenario, the NSW uses different data standards or different versions of one. This may occur very frequently when the integration of the NSW must be done through more than one RSW. In this case, the NSW will need to comply with multiple IOP's

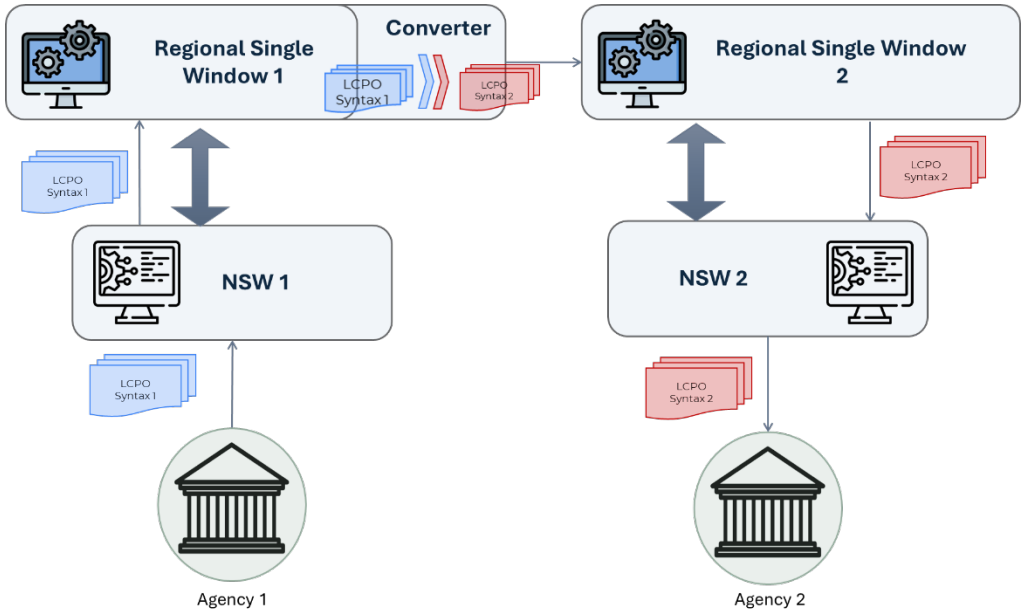


Figure 5 - Scenario Two - RSW

The following example is provided:
An ALADI country creates a new Certificate of Origin using an ALADI specific syntax, the agency sends this ALADI specific syntax to NSW. So, the NSW as in the previous scenario, maps the relevant data of the CoO into the international standard and compliant to the IOP of the RSW of destination.

In this case, let's put that the destination of the CoO it's an ASEAN country, where the ALADI syntax is not recognized. NSW will provide services to transform the ALADI syntax into syntax based on the international standard and the exchange protocol according to ASEAN. This way, the destination NSW will be able to receive the new CoO syntax through the interoperability protocol and take care of distribution to the local stakeholders.

Third scenario. LPCO where there's no recognized standard of data harmonization.

The RSW may facilitate harmonization by enabling data exchange between NSWs, applying the most suitable standards for data exchange between NSW, WCO Data Model may apply if there's not any other more suitable.

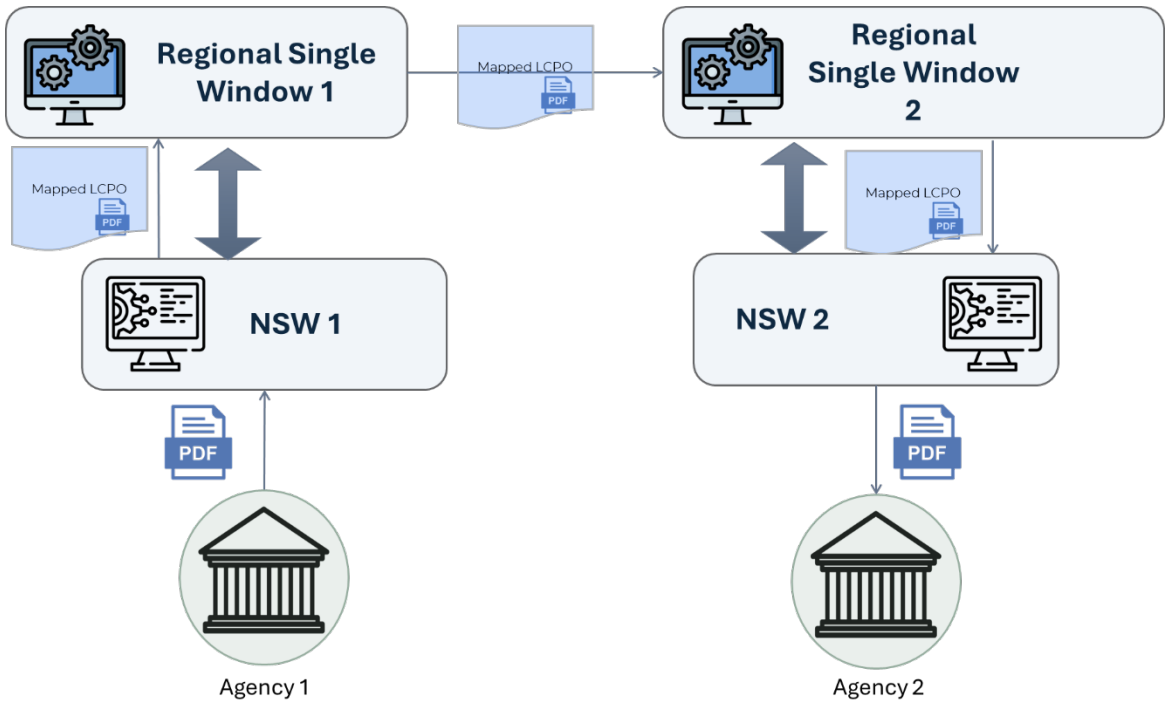


Figure 6 - Scenario Three - RSW

1. The National Agency approves a new LPCO.
2. The National Agency sends the new LPCO to the NSW in a non-harmonized syntax.
3. NSW extracts, if possible, relevant data for crossing border facilitation needs from the LPCO and maps it into the WCO Data Model or other relevant models if applicable. Further information from the Agency may be needed to be able to do the basic mapping of relevant data.
4. Include the original LPCO file in the map as an additional document object
5. NSW exchanges the Inter-gov message including the main data mapped and the original LPCO file with the RSW.
6. RSW, before sharing the inter-gov message with the destination NSW, may apply techniques of data recognition and modern technologies to extract the most relevant data from the file and represent it using the most appropriate data model.
7. Destination NSW sends the original LPCO in the original format to the destination National Agency, including the extracted LPCO to facilitate the data processing in the destination NSW.

The following example is provided:

Based on the example mentioned in the first scenario, where the National Agency approves a new Phyto certificate, but instead of representing it in digital syntax they just print it on paper and later scan it into an image or use a PDF document. This way, the data represented in the LPCO cannot be easily processed. The NSW will then receive the image of the PDF of the Phyto certificate and attach it to the Inter-gov message as a binary document.

It's in this case that RSW can help apply to the image of PDF modern techniques to recover relevant data for the Phyto and generate a message based on a harmonized syntax. The original image or PDF and the generated data message will then be forward to the NSW and from there, to the destination agency.

Fourth scenario. Documents are not provided by a government agency rather than from the private sector

Like previous scenarios, but with the main difference being that the document is not issued by a government agency but by some private sector stakeholder. So, we can find here a combination of documents with a specific data standard such as eBL or e-invoice, with is based on UN/CEFACT data standards and documents without any harmonization such as paper invoices, transport contracts.

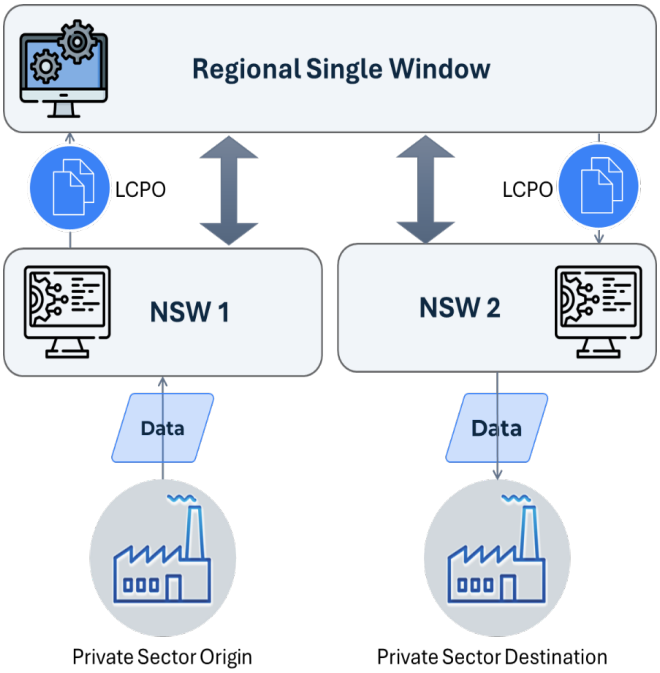


Figure 7 - Scenario Four - RSW

4.2 Challenges

In all these scenarios, RSW may face some challenges, such as:

- Harmonization was not done using the same data standard or syntax across all NSWs. In all the scenarios raised, the problem may arise that the different NSW or agencies involved have used different harmonization criteria or used different data standards to carry them out or even, some have not even carried out a data harmonization process.
  In this case, the RSW will be faced with mapping between the different standards used in the region, to provide translation functions from one standard to another. Also, even using the same standard, differences of version or implementation may request the RSW to provide services of translation from one implementation to another implementation.
- The specific platforms manage the data but do not allow access to other stakeholders interested in using it for automation or control purposes. RSWs must differentiate between what an LPCO is and the data it contains. Agencies when issuing an LPCO use their own data standard to represent it, but other actors in the border crossing sector would be interested in understanding and using this data to facilitate their own processes. The RSW must collaborate with the sector, offering the ability to interpret the different standards used by the different NSW to represent them in a single standard model, in particular the WCO Data Model if there's not a more suitable one.

4.3 Data Sovereignty and Legacy Systems:

- Member states must agree on data jurisdiction protocols (e.g., storage location, access rights) to resolve conflicts where national laws restrict cross-border data flows.
- A legacy system interoperability fund should be established to modernize outdates NSW IT systems, prioritizing WCO data model adoption and API-based integrations.

5. TECHNICAL CAPABILITY ASSESSMENT

After achieving a successful interoperability of master data and other relevant information between the NSW, RSW will focus on supporting a real-time integration where an original NSW will act in consequence of the data provided by the destination NSW for each operation.

The main difference with the previous chapter interoperability is that in this stage NSW will consider as part of its own internal process the need to request information to others NSW involved and proceed depending on the response given for each case, not just based on previously received information. This is sometimes referred to as Business Process interoperability (BPI).

In a graphical way we can see this interaction between two NSW as follows:

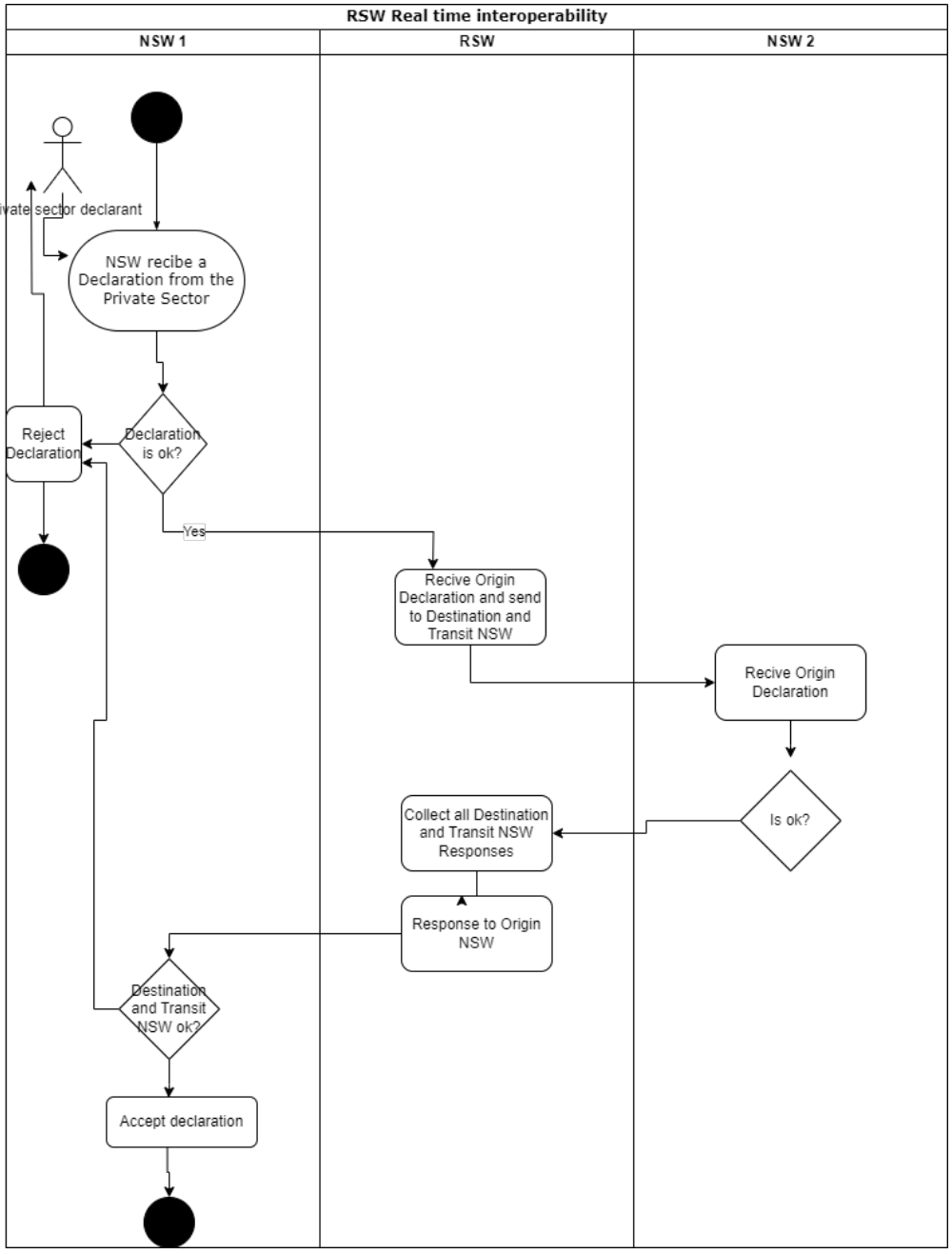


Figure 8 - RSW as a real time interoperability hub

1. NSW of origin interacts with the Private Sector declaration and other participating agencies involved in the operation till the declaration is ready to be approved
2. NSW requested the RSW to distribute a summary of the proposed declaration to those NSW involved in the operation, such as transit countries NSW and the destination country NSW.
3. RSW sends only the necessary information to each NSW taking into consideration the data agreed to be exchanged and the legal needs for data protection.
4. Each NSW validates the proposed declaration and determines if it's ok to accept the advance

declaration. More information may be necessary to be declared after this advance declaration by the private sector responsible for the operation in its country.

5. Each NSW responds to the RSW if it's ok or not and eventually makes errors if apply.
6. RSW collects all answers and gives a common response to the origin of NSW.
7. Origin NSW receives the RSW response with the destination and others NSW involved in the operation and acts in accordance

So, the fact that the process on the first NSW depends on the interaction between this NSW and the others NSW forces robust and stable communication. Presenting this as the main problem to resolve. In this guideline we are only introducing the main aspects of this, further details and specification should be part of the legal and technical agreement of the RSW governance.

The benefits of this on-line interconnected operation will be strongly important as it can prevent several problems that may occur at a very early stage of the commercial operation.

The most important issues to solve in this stage, no matter what technologies it used to achieve them, are as follows:

- Architecture. A correct architecture for RSW must ensure interoperability at a business level.
- Open standards. Allows each NSW to solve the integration challenges with its most suitable technical solution.
- Business process integration. The business process of each NSW will be defined with a dependency of other NSW so it's necessary to have a common understanding of the business process in a regional understanding at the RSW.

5.1 Architecture

Many different architectures can meet the objectives of an RSW and ultimately each project will find the one that best suits its needs, but we can find that Business process interoperability has a common relationship with the Service Oriented Architecture (SOA) where the platforms and technology solutions that give support to the business process must be designed taking in consideration the need of interoperability based on services, also known as API, Application Programming Interface.

This type of architecture allows two or more platforms interoperability between them and exchange data and logics that apply to each environment. An API is not only based on a data

harmonization of the data to be exchanged but also needs the definition of the services that will be exposed by one side and consumed by the other.

Likewise, it must be insisted that the architecture of RSW is not in itself an objective of RSW and any architecture that correctly supports the need of RSW will be valid.

5.2 Open standards

This architecture can be achieved with different technologies but must ensure that it will not be provided dependent and use open standards such UN CEFACT standards for data harmonization and OpenAPI for APIs definitions, following previous architecture recommendations. Take notice of the WTO Trade Facilitation Agreement (Article 10.3) underscores the use of international standards.

Already mentioned in previous chapters, data harmonization is a key factor of sustainable RSW and has already been discussed in this document, but to archive SOA architecture it is also necessary to specify the services that each RSW will expose so that each NSW will use to implement the requested interoperability.

OpenAPI is a syntax specifically designed to describe API and its services and data. It's not the only specification it may be used in a SOA architecture, but in general it's the most common syntax used in commercial processes. Its objective is to describe the technical aspect of the services provided by a solution allowing others to interoperate without the need to have the same technology on both sides.

UN/CEFACT has published in the past the document 'OpenAPI Naming and design rules' that specifies the usage of this syntax in their data standards and has developed the Core Component Technical Specification (CCTS) a methodology for developing a common set of semantic building blocks that represent the general types of business data in use today and for the creation of new business vocabularies and the restructuring of existing business vocabularies. The use of UN/CEFACT Core Component Library (CCL) by a range of data models helps the mapping and interoperability between one or more data models based on it.

5.3 Business process integration management

So far, the business processes of each NSW are defined by each NSW in the context of their own legislation and definitions. But when a RSW is established at a business process level, the national business processes are now interconnected, which brings the challenge to align definitions and

process semantics to ensure a correct implementation.
At this stage, RSW is not only exchanging data between the stakeholders but complementing the local view of the business process into a regional process.
The orientation to services is in fact a way to represent a set of business rules that represents the legal and normative rules that the process must accomplish to be valid. So, in the SOA architecture, RSW expresses in services described in a standard way, the data needs and rules requested by each government. Managing in this way to implement a coordinated regional business procedure in a legally distributed way.

UN/CEFACT has established a modeling methodology based on the Unified Modelling Language (UML) which is called the UN/CEFACT Modelling Methodology (UMM). UN/CEFACT has developed several specifications around specific business processes.

5.4 Technological models for interoperability

Different architectural models can be used in creating an RSW. None of them is right or wrong, and each RSW must study its properties and possibilities to select the most appropriate one.

In this chapter, we will explore various models, highlighting their main characteristics along with their respective advantages and disadvantages.

(A) Peer-to-Peer

A Peer-to-Peer (P2P) model is a type of RSW architecture in which each NSW interoperates directly with each other, without depending on a central server.

Decentralization: In a P2P model, there is no central platform that coordinates the network. Each NSW exchange information with the rest of the NSW in a direct link communication.

Resource Sharing: NSW in a P2P network share and access resources directly with each other and agreement of data exchange must be agreed in each exchange.

Scalability: P2P RSW may have difficulty scaling and adding new members as in each case the new member must interconnect with all the other members, having to deal in each case with the different technologies used.

Autonomy: Each NSW is autonomous and can make independent decisions. There is no central platform that dictates the rules or control of the RSW

Examples of Applications: P2P RSW can be found in MERCOSUR INDIRA, where each country interoperates with the other members Customs to exchange regional Customs Declarations.

Another example can also be Alianza del Pacifico IOPack, an exchange of CoO and ePythos between its members that works in part as a P2P model. IOPack is an Interoperability platform based in a distributed gateway model, using digital signed web services used to exchange ePhyto and Origin certificates and Customs Declarations [22].

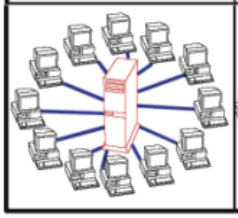
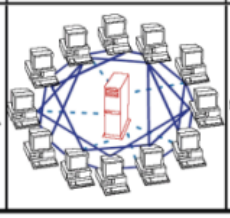
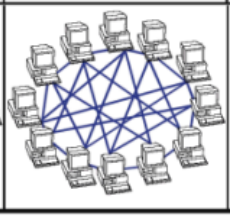
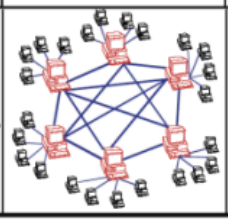
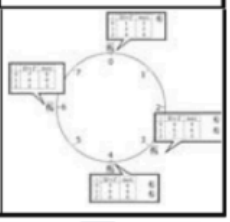
Client-Server	***Peer-to-Peer***			
	1. Resources are shared between the peers 2. Resources can be accessed directly from other peers 3. Peer is provider and requestor (Servent concept)			
	Unstructured P2P			***Structured P2P***
	1st Generation		***2nd Generation***	
1. Server is the central entity and only provider of service and content. → Network managed by the Server 2. Server as the higher performance system. 3. Clients as the lower performance system Example: WWW	*Centralized P2P* 1. All features of Peer-to-Peer included 2. Central entity is necessary to provide the service 3. Central entity is some kind of index/group database Example: Napster	*Pure P2P* 1. All features of Peer-to-Peer included 2. Any terminal entity can be removed without loss of functionality 3. → No central entities Examples: Gnutella 0.4, Freenet	*Hybrid P2P* 1. All features of Peer-to-Peer included 2. Any terminal entity can be removed without loss of functionality 3. → dynamic central entities Example: Gnutella 0.6, JXTA	*DHT-Based* 1. All features of Peer-to-Peer included 2. Any terminal entity can be removed without loss of functionality 3. → No central entities 4. Connections in the overlay are "fixed" Examples: Chord, CAN
				

Figure 9 –Examples

In short, a Peer-to-Peer model is based on the idea that participants are equal and can exchange resources directly without depending on a central entity, leading to a more decentralized and distributed network. New members can start exchanging data with only a few of the existing members and that may turn into unstable and difficult to evolve architecture.

[22] https://unece.org/trade/documents/2025/01/presentations/pacific-alliance-iopack-single-window-alvaro-galvez

(B) Centralized

Centralized architecture is one in which there is a central platform or server coordinates and controls interoperability.

Hierarchy: A central server or agency has authority over the other NSW. This central agency can make decisions and define the technical specifications of the RSW.
Dependency: All NSW depend on this agency platform to interoperate between each other. The regional agency acts as a central point of control and coordination.

Control: The central agency exercises significant control, including user management, resource allocation, and general decision making. This can make it easier to implement security and access policies.

Scalability: Although it's a very scalable model for RSW as a new member must interoperate only with the central platform. But on the other hand, restrict the interoperability to those countries that are part of the regional agency.

Examples: Centralized networks can be found in Central America's SIECA agencies, where a centralized platform helps the regional countries to exchange data of transit.

In summary, a centralized RSW model is characterized by the presence of a central agency that plays a crucial role in management, control and distribution of resources in the network. Although it can be efficient in management, the dependence on the central agency. It could apply if in an RSW there is a strong asymmetry between the maturity level of the different NSWs and the strongly more developed NSW acts as a centralized platform, although this is possible, this scenario must also be seen as a centralized architecture where it shares a resource with the most developed NSW. This scenario presents a particular challenge of preventing the RSW from not developing its own regulatory and legal framework and taking the legal framework of the host NSW as a default.

(C) Hybrid

Hybrid Architecture Implementation:

- Centralized Governance: A regional authority manages authentication (e.g., PKI-based access tokens) and metadata standards.

- Decentralized Data Storage: NSWs retain data ownership but publish metadata (e.g., document types, availability) to a shared ledger (blockchain optional).
- Fallback Mechanism: Peer-to-peer data exchange is enabled if the central hub fails, ensuring business continuity.

5.5 Information and Communication Technology

Developing a Regional Single Window System, Information and Communication Technology (ICT) serves as the bedrock for a seamless and integrated approach to facilitate regional trade and streamline business operations. Within the ICT framework, the success of the RSW Platforms stem is contingent upon several key factors.

Interconnected Systems: The development process underscores the need for integrating diverse information systems seamlessly. This integration ensures that data flows effortlessly among stakeholders, fostering collaboration and enhancing the overall effectiveness of regional trade processes.

Skilled ICT Professionals: The availability of skilled system analysts and database administrators is paramount. Their expertise is instrumental in designing, implementing, and maintaining the ICT infrastructure that supports the RSW platform. Their proficiency contributes to the platform's functionality and ensures its resilience in the face of evolving regional trade dynamics.

Harmonization and international standards. A key aspect of the RSW sustainability will be the correct application of data standards that ensure the interoperability of the different national trade processes.

Reliability and Availability: Achieving 99.99% availability is an important goal or as close to that as possible. This necessitates a robust ICT infrastructure capable of withstanding potential challenges. Redundancy measures, backup systems, and proactive monitoring are implemented to ensure the reliability of RSW.

Standardized communication Protocols: ICT facilitates the establishment of standardized data formats and communication protocols. This standardization ensures uniformity in data exchange, reducing complexities and enhancing the interoperability of systems across the region.

Capacity Building: As the system evolves, capacity-building initiatives are crucial. Training programs and workshops are conducted to empower users, including government officials, customs personnel, and business representatives, with the knowledge and skills needed to

navigate and utilize RSW effectively.

Cybersecurity Measures: Given the sensitive nature of trade-related information, robust cybersecurity measures are implemented. Encryption, secure access controls, and continuous monitoring help safeguard the system against potential cyber threats, ensuring the confidentiality and integrity of data.

Open standard. RSW will be required to use an open standard of communication and data to ensure that each NSW develops its own integration features with its own technologies. Using Open standards ensures that different providers can build in each country the technological infrastructure to support the exchange of data with the RSW.

Standardized and data harmonization. A key factor is the standardization of a lot of different types of documents and declarations, particularly on commercial documents that must be harmonized to allow a reusable representation of them.

User-Friendly Interfaces: The development of user-friendly interfaces is pivotal for widespread adoption. The ICT focuses on creating interfaces that are intuitive and accessible, minimizing the learning curve for users and encouraging active participation in RSW.

Service Oriented Architecture. A RSW will be distributed by definition and a strong orientation to services in its architecture to ensure the evolution and inclusion of new members, also allowing in this architecture that each component of the platform may be developed using the most suitable provider but ensuring the interoperability between different components of the platform.

Data Management: The heart of the RSW platform lies in its data. System data administrators play a crucial role in ensuring the robustness and efficiency of the database. Their responsibilities include optimizing data storage, implementing security measures, and overseeing seamless retrieval and exchange of information.

Authentication and digital signatures. Considering UN/CEFACT recommendation 14 in its 2014 edition, it is essential to have methods and tools for authentication, authorization and identification of the acting parties throughout the process. As well as the authenticity and inalterability of the data exchanged.

In conclusion, the development of an RSW platform within the context of ICT requires a holistic approach. By addressing integration, human expertise, database management, reliability, standardization, capacity building, cybersecurity, and user experience, the ICT becomes a

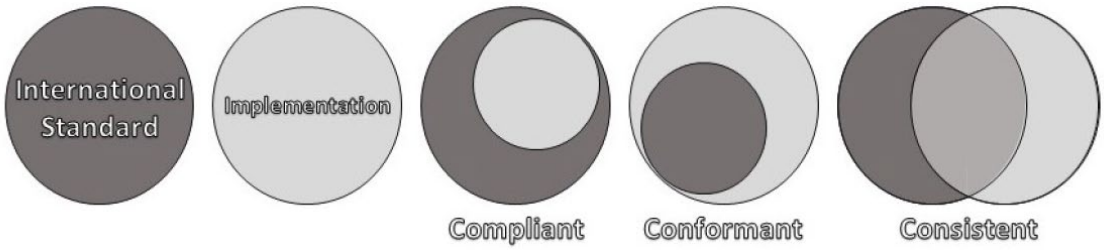
catalyst for fostering efficient and collaborative regional trade processes.

5.6 Conformant, compliant or consistent

When building an RSW for sure several products and ICR providers will be considered and it's very important to verify the level of adoption of standard of each component of the RSW to ensure the technical sustainability.

When the implementation of a given solution is defined solely with the terms and within the scope of a given standard, then it can be considered compliant. When the implementation of a given solution uses all a given standard and then builds upon that with extensions, it can be considered conformant. However, the extensions which were added may not be interoperable with other solutions since they are not included within the referenced standard.

When the implementation of a given solution uses only parts of a given standard and builds extensions upon that, it can be considered consistent. Again, the extensions which were added may not be interoperable with other solutions since they are not included within the referenced standard. What is more, as only part of a referenced standard is used, there is a chance that another party which uses the same standard might not be able to align with this solution since parts of the standard will be missing from the "consistent" solution.



The objective of using a standard correctly should always be to achieve full compliance whenever feasible. However, there may be instances where it is deemed acceptable to deviate from the standard, provided there is a clear rationale for doing so. Typically, non-compliance is justified by weighing the costs against the benefits, meaning that the short-term costs of adhering to certain aspects of the standard do not outweigh the long-term benefits.

In such cases, those responsible for the project must:

- Identify which parts of the implementation do not comply with the standard.
- Understand the reason behind tolerating these deviations.
- Develop a plan to address and mitigate these non-compliant issues.

5.7 Challenges

Many times, with the objective of facilitating implementation and allowing an easier migration between a legacy system and a new one, some specifications or recommendations of the data standards are omitted or ignored. What may look justified in a local view will generate extra difficulty when implementing an RSW. Those inconsistent issues will have an exponential cost to solve once a regional level of integration is achieved and in general the cost of solving those problems in the RSW is much higher than if they were correctly implemented at local level.

6. PUBLIC AWARENESS AND STAKEHOLDER ENGAGEMENT

In the future, RSW could be a key component in supporting the private sector to achieve progress in its internal digitization processes. Currently it is difficult to find successful cases where RSWs are used as a means of validation and communication between different private commercial stakeholders.

In this chapter we will explore the main challenges and opportunities that arise, opening the discussion for future implementations. Thus, trying to promote the development of RSW at the service of the private sector as well.

6.1 Legal Aspects and Issues

In addition to the public law requirements discussed in chapter 4, there are aspects of commercial law and issues that may be considered with the integration of RSW:

- Exporter and Importer shall be bound by the same law to realize a safe commercial contract. Especially in the case of electronic transactions that have more limited history and precedent contracts and aspects of the transaction in writing, interested parties will have much concern on equality of laws. Therefore, the RSW agreement shall supersede the local laws of both export and import countries, while it is sometimes not so clear in consideration of the inviolability of sovereignty. Note: Alternatively, there will be an option for member states to agree to treat the RSW Agreement as the "special law" of each country to accommodate such a situation.

- Some countries may have laws that guarantee the validity of trade documents only in writing, especially the validity of securities such as B/Ls. International agreement is needed on ownership, possession, and mortgage of goods.

In order that commercial documents are exchanged via RSW without concerned people's doubt, it will be required to review the adequacy of local laws.

- It is crucial to engage the private sector through workshops for knowledge sharing and in the law-making process, by issuing draft regulations for public consultation and feedback to identify potential challenges, and recommend solutions based on their industry expertise.

- Right to obtain data. This may constitute a legal issue affecting not only NSW but also RSW, countries have very different policies to access public documents and transparency. Customs information, however, is generally treated with confidentiality but other types of information are necessary. The different treatments of information could cause problems in the transfer of information. These are often constitutional issues and are seldom subject to legal harmonization. Constitutional rights are normally enjoyed by the citizens, or residents only, and not by foreigners.

6.2 Roles and permissions

The objective then sought would be for the RSW to be a mechanism so that a private actor can provide information on the trade process and this information is taken and accepted as valid by its counterparts in the destination. A major challenge faced is that it is not always perfectly determined who will be the private parties acting at each stage of the logistics chain, that is, generally the exporter knows or has a way of identifying who is sending him his merchandise, there will be contracts and even payments between both parties.

But these are just two of the many private parties that intervene in the entire process, from warehouses, dispatchers, transporters, insurers, among many other roles, acting at different moments of the process.

The main challenges are:

- Defining the actors who are authorized to access the information of the commercial operation.
- Defining the specific data that the authorized actions are allowed to access to fulfill your part of the process.

From this point of view everything must start from the beginning, whoever is the first private operator that intervenes in the process, generally the exporter at origin. This first private actor will have full access to the information sent, since he is basically the one who has provided all the information so far.

It will be this actor who through mechanisms grants access to other actors and assigns privileges. Thus, this exporter can surely identify his counterpart at the destination, thus adding another private actor with access permissions.

Each private actor would then have two actions on the data in the RSW.

- Invite another private person to access one or all documents.
- Allow another private person to invite third parties.

Used correctly, these two actions allow us to extend the network of private parties involved, granting those permissions to all or certain documents of the commercial operation.

6.3 Access Token Mechanism

Each declaration in the RSW must be uniquely identified to grant private actors access only to relevant documents. Once these documents are identified, the first private actor may invite others to access and view those documents in the RSW. In this way, both private actors will have confidence that they are using the same information as the governments involved in the operation.

To achieve that permission, the private actor who is granting access should be able to issue access to one or all the documents of the business operation.

This access token allows you to identify

- Who granted it.
- To whom do I grant it.
- What documents was access granted to.
- Maximum access time.
- If it was already used\accepted.
- If you allow whoever granted, to create new access tokens to those documents.

In this way, the chain of responsibilities between peers is formed and it is clear who has access to which documents.

6.3.1 RSW Features to Allow Access Token Mechanism

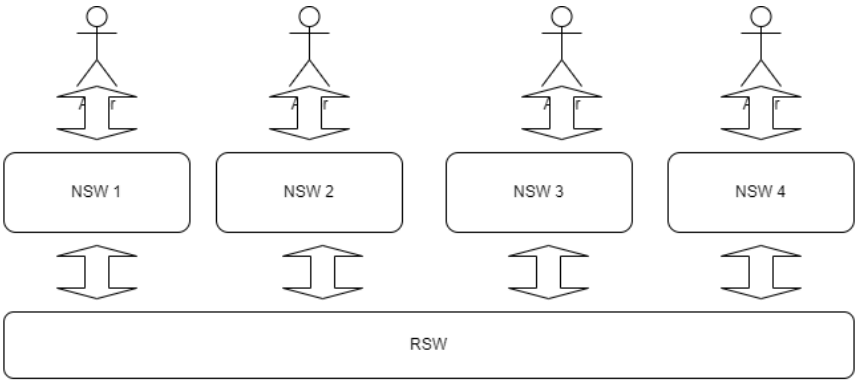
To implement this distributed access mechanism, RSWs must implement through mechanisms at least the following capabilities and functionalities:

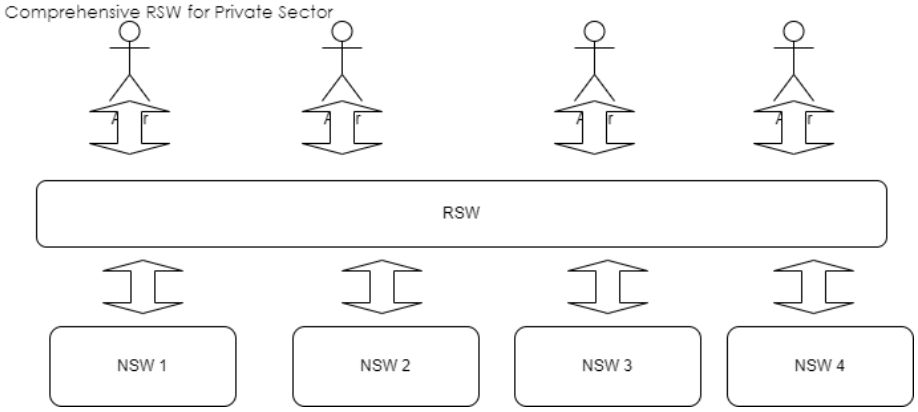
- Unique Identification of parties. Each NSW involved in RSW must somehow identify each private sector actor allowing them to have a regional database of operators.
- Unique Identification of commercial operations and its different documents involved.
- Create Access Token. Identifying creator, destination, Operation and documents involved, expiration date, scope beyond other information.
- Log of activity of each Access Token. Each time an Access Token is used an auditory must be preserved.
- Secure identification of parties. Using modern secure methods of authentication to ensure access only to authorized parties.

6.4 One Single Regional Declaration Proposal

In this chapter we will take some liberties to explore some ideas that allow us to present the RSW as a platform that integrates the regional private sector. Currently the focus of the RSW does not include this approach and concentrates on interoperability between governments. However, considering the objective of this document as a proposal of ideas to be put forward to the community, this proposal is included in the document.

To date, the NSW generally serves as a single declaration point that addresses the complexities of the various agencies involved in cross-border operations. The RSW has been presented as a hub of interoperability that supports NSW in achieving their objectives. However, RSW can also take a broader approach for the private sector, encompassing the complexities of each NSW and providing a common, harmonized, and standardized method for submitting declarations to any of the NSW involved.

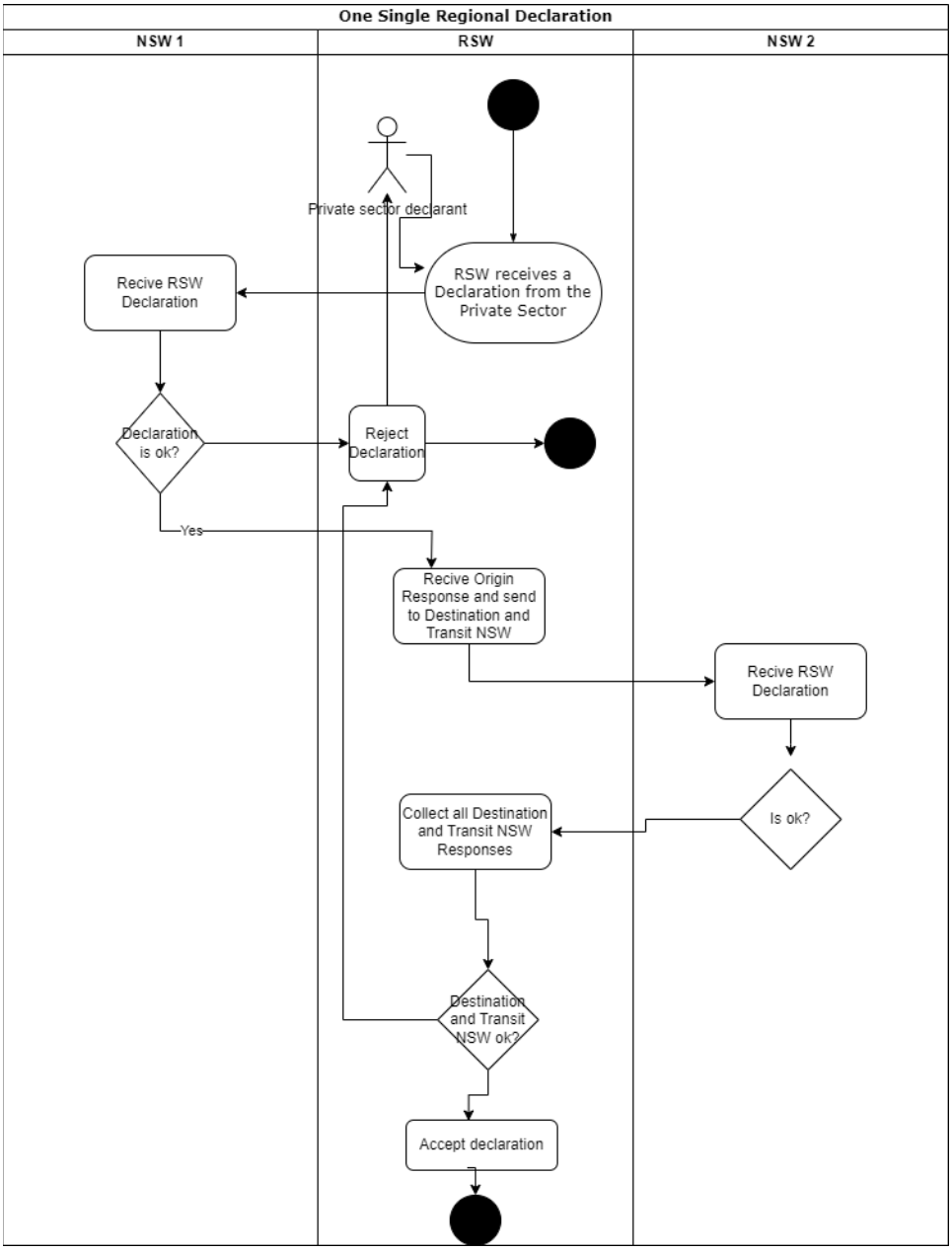




With this objective, all the NSW should agree on the services to expose in this way and in any of the different processes that each NSW may have. RSW will need to provide to the private sector all the services required for each NSW and because of that, a harmonization of the process is critical.

Once a Private Sector operator starts its process using the harmonized services provided by the RSW, it can jump into the NSW services for any specific country related services that may not be standardized in the RSW. It's important to remark at this stage that the fact of operating on a regional platform does not mean that each party must accomplish its responsibilities in each country. A unified declaration should be seen as a standardization of data and processes, but not as a weakening of the legal responsibilities of each actor in the regional process.

In a graphical way, now we can see this interaction between the Private sector and the RSW as follows:



1. RSW receives from the Private sector a new declaration.
2. RSW evaluates the NSW involved in the declaration and shares the relevant data of the declaration with the Origin NSW.
3. Origin NSW evaluates the declaration and whether its ok or not response to the RSW.
4. RSW receives the Origin NSW response and if it's ok, proceed with the next NSW involved in the operation. repeating this task with all the NSW involved.
5. Once the RSW has received the response of all NSW, provide a unified response to the private sector declarant, accepting the declaration or not depending on each response.

The main difference between with stage and previous is that the RSW will have an harmonized, standardized and unique point of declaration provided to the Private Sector, who will have to deal only with this service ignoring then all the differences of implementation that each NSW may have. Creating a single regional declaration that covers all the national needs of data.

6.5 Benefits of full integration

1. **Regional integration:** Single Window can be seen in a broader context as tools not only to improve national competitiveness but also to promote regional economic growth.
2. **Risk analysis:** Receiving information from the export declaration of merchandise which is arriving would allow government agencies in the importing country to assess, in advance, any security, safety, fiscal or other risks. This aspect is outlined within the WCO "SAFE Framework of Standards" in the third pillar on Government-to-Government (G2G) communication.
3. **Advanced security declarations:** Building on this principle of risk analysis, many countries have put in place an advanced arrival security declaration system. This again is outlined in the WCO "SAFE Framework of Standards" in the first pillar. Now that these systems have been functioning for a few years, one of the major concerns is with the data quality: the information received is often not reliable enough to perform a proper risk analysis. Obtaining this information at the source, from the exporting country, would improve the data quality.
4. **Infrastructure-use planning:** At a minimum, exchanging information about the volume of goods which are departing from one country, and which will arrive in another country on an approximate date would allow the importing country to try to adapt accordingly its infrastructure-use planning in order to accommodate the expected trade volumes.
5. **Combating illicit activity:** When identifying illicit merchandise or suspected illicit activity at export, the exporting country could forewarn the importing country in order to ensure that the merchandise is properly inspected upon arrival. This could also be extended to suspicions of fiscal evasion through trading transactions, and to allow countries to plan the proper inspection relative to such transactions.

6.6 Challenges

A strong harmonization of data and services and the coordination between stakeholders must be done in the RSW to achieve this stage, as the RSW will need to represent all the local declarations and services in a single regional declaration. This is in fact a big challenge that could not be accomplished if the RSW and NSW had not gone through the harmonization and standardization

discussed in previous chapters. It will be natural to find a specific process, so the RSW provides regional support to a small number of processes, as the complexity of reaching this stage for a RSW is important. Cases such as the EU ICS 2.0 to provide the services for a European pre-arrival security declaration. This kind of platform is in fact an RSW with a very specific objective.

To achieve this objective of a Regional Single Declaration, some basic features must be solved previously:

- **Single regional identification of parties:** Any legal or physical party has to be identified in a unique way in all the NSW involved being responsible for its declaration no matter where the entry or exit point.
- **Common business process:** That allows each NSW to identify parties involved in each process and how they interact with each other. Harmonized declarations. A single declaration must be enough for all legal and normative needs of each NSW, avoiding the creation of an aggregation of all data needed in each country.
- **Business process/Semantic interoperability:** All NSW must have a common business process to deal with all the interaction with the private sector, although it's not necessary to have a general business process for all processes, each NSW may have nationals in its internal process. Anyway, an alignment in all this national process will help in future sustainability.
- **Standardized and open services specification:** It is necessary to have a standard and open specification of all the RSW services allowing each NSW to implement at national level on its own platform with the most suitable technologies for its own NSW platform.

7. ANNEX

7.1 General Challenges of the RSW

Issue	Guideline
Political will may vary, potentially causing delays in decision-making for the implementation of the RSW	To address this challenge, the RSW should recognize that each National Single Window will integrate at different paces. Establishing a governance structure for the RSW that is both responsive to NSW members and autonomous in execution will help mitigate political delays. Policymakers should be continuously informed of the strategic benefits of RSW implementation, ensuring sustained commitment and reducing the impact of changing political will.
The private sector is often overlooked in the early stages of RSW development and may not see the benefits. RSW systems are typically designed with a focus on government control needs, without considering the requirements of the private sector. Additionally, the private sector faces challenges in submitting the same information due to the lack of coordinated data harmonization.	Private sector representation should be included from the first step of the RSW as their perspectives should be included in any trade facilitation measure. Take into consideration the definition of data that the private sector has as this stakeholder is in fact the objective of trade facilitation, so, their data definition will in fact be the most suitable.
Different international standards overlap with their data definitions, having then more than one way of representing the same information. Organizations such as IATA, UPU, CEFACT, WCO, IMO beyond others have different views of the same	Data standards for the RSW must be defined for those data elements that do not have a clear and recognized international standard but must take into consideration those standards that are in fact the guidelines of a specific industry. This will present the challenge of having to deal with different

Issue	Guideline
commercial activity so they represent data in a different way. This brings challenges to exchange information between all stakeholders. Also not harmonized data declaration and usage of different data standards. The exchange data on its first step exposes the difficulty that each NSW had been in general working without a regional coordination and differences between models show up.	representations of a data element depending on the industry where it's been used. In these points RSW may consider specific integration points API for those standards that are strongly worldwide used such as CEFACT e-Invoice or eBL, UPU beyond others and use the WCO Data Model as a common definition for those that do not have a specific standard. Also, internally, RSW may choose the use of a single model for all data, no matter the specification of the interfaces, so be able to build common modules such as Risk Management based on this common model. In this case, the WCO Data Model may apply as that common model having to provide the mapping between each specific standard used in the interfaces with this model. Other models may be considered also depending if the RSW focuses on reduced cases such as maritime, port communities or other types of NSW.
Customs and cross-border procedures may not be aligned between countries, which makes it difficult as something that may have a fast-track procedure in one country may face regular procedure in the other, so the benefits of the special procedure are lost at the end.	Including in the RSW a legal team with the purpose of keeping RSW legal framework aligned and coordinated in each country member of the RSW
Different data protection legislation between member countries of NSWs.	Data protection, in particular personal data, have to be defined and each NSW must have a common understanding of what data is public and what data

Issue	Guideline
Each data exchange built in the context of a RSW must include the data protection specification and legal agreement requirements for mutual recognition.	is under any type of data protection. Each data exchange agree in the RSW must have a specification of data protection and a legal agreement to be signed between the parts before the exchange takes place
Pace of implementation of a RSW may be slow in the first steps, particularly during the stages of legal and regulatory definition; this may be a challenge for those NSW that are in need of showing results.	RSW must set a calendar of implementation that may be different for each member but once accepted it should have the political will to achieve this agenda. In this way, first steps of this process will be the establishment of required legal framework at national level and political will to move on this integration process
Lack of relevant skills and knowledge in RSW affects the resilience of the RSW.	RSW must include in its objective's capacity building in technologies and integration best practices in each NSW member as in the RSW itself. This may include not only software components required by the RSW, but also cloud infrastructure, international standards that may apply to the RSW and cutting-edge technologies that may have an impact on RSW.
Technological architecture should be defined as allowing the inclusion of new members without having to depend on the adoption of changes in the previous members.	RSW should be constructed technologically-agnostic allowing different tools and technologies to be used in each NSW, avoiding having a specific technologic provider dependence not only on the software components but also on the infrastructure and communication solutions, this must be agreed when defining the governance of the RSW.

Issue	Guideline
As different agencies and organizations are involved in a commercial procedure, each request and providing information in different formats and standards, RSW will face the problem that each NSW may have chosen different standards to represent the same electronic document.	RSW needs to know the difference between data and certification. RSW is focused on the exchange of data to facilitate cross boarding and collaborates with those LPCO that do not have a mechanism to exchange information between the original organizations.
Overlap between RSW and industry specific platforms may be seen as a competition. RSW will have to define where a specific LPCO needs to be assisted and help RSW to exchange this LPCO between each NSW and where a specific industry mechanism already is defined as used by the industry.	Exchange of data also includes exchange of semantics, each data to be exchanged must specify the syntaxes of the exchange but also the semantics apply to the specific scenario. Again, the correct use of the most suitable Data Model is the key factor to avoid incorrect usage of data.