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IT STRATEGY

1. HOW THE IT STRATEGY IS REALISED

In this section, the main principles of the IT strategy will be demonstrated on how they are realised and on their value for all stakeholders.

1.1. THE SERVICE ORIENTED ARCHITECTURE

The introduction of the service oriented approach in the design of the new IT systems for customs will result in flexible and modular applications that can adapt easier to the changes and can benefit from the reuse of existing functionality.

The Service Oriented Architecture (SOA) is mainly a way of thinking and designing that aims to align the business world (organisation, processes, workflows, rules, etc.) with the world of computing - creating software systems to meet business needs - so that both become more efficient. The SOA aims at modelling business services related directly with business operations (business tasks), and implementing them through software services as it is explained in "SOA Overview and Guide to SOA Research" conducted by Gartner in 2011.

This approach is in line with the European Interoperability Framework which recommends the development of a component based service model allowing the establishment of European public services by reusing, as much as possible, existing service components.

In order to model this real world operation and to design IT systems that implement these business services, SOA focuses on the analysis of the business processes as to identify the services that are needed to perform this operation and the orchestration of these services in order to produce the desired results. For example, following the analysis of Import, Export, Transit procedures, all of them require an IT application to perform risk analysis, therefore, the most efficient solution would be a unique application that offers risk analysis services to all of these procedures adapted to each particular process and not three risk-related IT systems as one for each workflow.

By implementing SOA, the aim is to use a common design pattern associated with proven technologies. There are many examples of successfully implemented SOA systems ranging from IT systems of international companies on the private sector. As examples: IT systems for airline companies - Lufthansa, United airlines and

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Delta airlines (for reservations, inventory and passenger check-in); IT systems in the area of logistics, Con-Way, the logistics and trucking company and IT systems in the area of communications Motorola and T-mobile[1] ; e-government IT systems offering one-stop shop services, such as Denmark's Customs IT system and Greece Customs IT system. Finally, even the famous CERN (European Organisation for Nuclear Research) is employing SOA-based software to monitor and manage potential emergencies.

Applying the SOA approach will result in:

- Increased flexibility and reusability and reduced cost: The adaptation of the IT systems to new functionality is easier, faster and at a lower cost, since changes have a limited impact on specific services. Also with SOA, early prototypes can easily be built to avoid erroneous implementations and maintenance cost at a later stage;

- Improved business agility and alignment of business and IT systems: SOA is a natural complement to the BPM policy, as the implementation of business processes can be translated in a work flow of software services. SOA is for IT the natural equivalent of what Business Process Models are for Business. Furthermore, SOA does not imply the rebuild of the existing systems similarly for the same reason that BPM does not implicitly change the processes themselves; it only gives an opportunity to manage them in a more efficient manner. In addition, the design on the basis of a set of services allows functionalities to be specified in an unambiguous way;

- Increased consolidation and increased revenue: There are many opportunities that could be enabled by the SOA. As recommended in the "MCC implementation assessment" study, cloud technology meaning that these services then can be hosted by a MS, common cloud infrastructure from the Commission or hosted by a reliable service Supplier. Furthermore, the COTS – implemented IT solutions from the market - are proposed as alternative solutions in order to deliver the services in a more efficient and effective way. Once the services could be defined with structured SOA governance by means of a common Reference Architecture, there is possibility to have them:

  - Centrally implemented by DG TAXUD;

  - Shared by any MS from the existing national services;

  - Collectively developed by some collaborating MS;

  - Provided by a service provider from the market.

The main assumptions for the SOA implementation in customs are:

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[1] Ten examples of SOA at work, Joe McKendric, Dec 2006 and Jan 2008 studies.

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1. Not mandatory for MS to adopt nationally: It is not the purpose to impose SOA technologies for the systems, MS may implement the defined services the way as it is decided at the national level.

2. Common language and standard in the EU. The objective of the Reference Architecture is to define a mandatory framework allowing to address unambiguously IT related matters in Customs in the EU from the service, process and data perspectives.

3. Gradual approach: SOA does not have to be applied everywhere simultaneously, it will be applied gradually, where substantial changes or new IT systems are required to be implemented.

4. Started with central services: DG TAXUD will itself apply SOA for the central development, in order to make services available to be consumed by MS.

5. Does not impact the current systems: There will be no impact on the existing systems and in addition stability of existing interfaces shall be assured. Therefore, when a MS decides to use the central services, minimal integration effort needs to be foreseen to allow full compatibility regardless the MS is SOA compliant or not.

6. Tested by the architecture group: The service paradigm has been tested by the architecture group. The Reference Architecture is based on the Service Oriented approach and for the IT projects of the MASP an analysis of the services needed to be implemented in order to offer the required functionality has been in progress in compliance with the Business process modelling as it is explained in the corresponding chapter of the Reference Architecture.

7. Creating the conditions for market standardisation. When the Reference Architecture will be sufficiently developed, it shall be used as a guideline to COTS suppliers so as to produce compliant products and services.

In conclusion, the first project that will be designed and implemented using the SOA approach is Customs Decision (the SOA pilot project). Projects addressed in collaboration shall also be using SOA based design. The adoption of the SOA will not alter the existing message exchange patterns and will have no impact to the existing common systems which will continue to operate on the basis of existing IT architecture.

## 1.2. THE CCN2 WITH FULL BACKWARDS COMPATIBILITY

CCN2, which is planned as a specific project in the MASP, is the evolution of the current CCN architecture and services. The CCN/CSI operational infrastructure consists of a closed, secured network infrastructure that is provided by the European Commission to facilitate the exchange of information between the National Administrations (NA) of the Customs and Taxation areas. It will apply state of the art SOA architecture and provide an infrastructure for the SOA with full set of value-added services to support the evolution to new application development

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and deployment paradigms. Applications to be developed could be deployed using this new CCN2 infrastructure.

TAXUD platforms such as CCN2, SPEED2 & Application Platforms are conceived to support public services in line with the European Interoperability Framework Conceptual Model.[2]
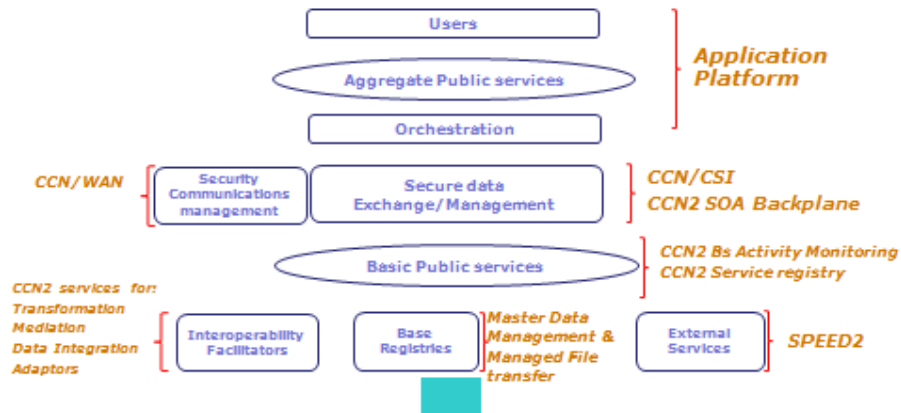
It is not expected to have a strong dependency between the development of the CCN2 and the new systems to be developed applying SOA. Systems which are not developed applying SOA can also be compatible with CCN2 (e.g. EOS). It is foreseen that CCN2 will be backwards compatible with current CCN/CSI for The time needed to phase out CSI.

1.3. IS CENTRALISATION OF PARTS OF CUSTOMS IT FEASIBLE AND USEFUL?

The aim of centralisation is to address the IT solutions optimally without altering the responsibilities of the National Customs authorities and the Commission. In addition, central implementation and/or operation of IT systems can only take place if it can be justified by a positive business case.

The possible centralisation of the EU Customs systems needs to be considered from the following perspectives/possibilities:

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[2] Annex 2 to the Commission communication on interoperability "Towards interoperability for European public services",Dec 2010 COM (2010) 744

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1. Central development and operation of systems:

   In this case agreed IT systems for Customs could be developed and operated centrally so that MS could use the functionality that is provided by a common system. Such an approach could be based on the EOS experience, extended by the capabilities provided by SOA.

2. Central development with national business expert involvement:

   In this case, IT System/Services of the national domain could be developed centrally, supported by customs business and IT experts from MS on the condition that this is justified by a business case. In such project, national workflows in Customs Decisions domain could be implemented centrally. For centrally implemented systems where interaction with trader is necessary, the feasibility of direct access for traders to central capabilities is explored in the Uniform User Management and Digital Signatures project. This work requires active participation of MS experts in the project to ensure that national requirements are met effectively.

3. Shared service components developed by collaborating MS:

   Instead of designing and developing 27 times similar functionalities, MS could work in a collaborative mode in particular areas to design and develop common services. The Reference Architecture can be used to facilitate this shift towards a new generation of IT systems for Customs built on the principles of harmonisation, convergence and modularity by providing a common view on the IT system design in various level of detail. These services could be deployed centrally or deployed by one MS and shared by many or customised and deployed by each MS.

   Based on this work the market can offer solutions that meet effectively the requirements and the high quality standards that have been defined beforehand. This aspect is also closely linked to the collaboration work. All these types of solutions can run effectively in a cloud environment meaning that they can be hosted by some MS, the Commission or a Service Provider.

4. Central data repository:

   In this case the creation of a central repository is used in an IT system implementation so as to reduce the number of interacting parties from $n*(n-1)$ to $(n+1)$, where n is the number of MS. This approach is meant to increase the agility of the IT systems deployed in the customs Union, but it needs to be understood and agreed in the case of specific systems. This option will be subject to feasibility studies and business case analysis and will require high level discussions and agreement prior to move to the implementation phase.

In any case, MS will always have the choice to use the central services or to develop national ones.

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- For the national domain, MS may exercise their responsibility the way they consider it to be more efficient;

- For the common domain, when exchanges between MS are involved, systems will continue to be based on the same or analogous design patterns as in the past. The evolution might be the exposure of web services rather than CSI queues in the future (2015-16) for NEW systems;

- For IT systems developed by the Commission, systems shall expose services, accessible through CSI or web services and will replicate final data to all MS for use in their administration;

- For the external domain, the Commission intends to prescribe the technical specifications to be implemented for at least the new systems (e.g. "MCC Notification of Arrival, Presentation Notification and Temporary Storage" project).

In conclusion, centralisation aims at the rationalisation of the total cost of ownership of customs IT systems and by no means the alteration of the way national responsibilities are exercised. By having IT systems implemented with more central effort, it will avoid having 27 times implementation of similar or nearly identical functionalities, and solve the issue of absence of business case justification in certain countries. The high cost, complexity, lengthy implementation time associated to such repetition of implementation and the multiplied costs of maintenance will be reduced significantly.

1.4. COLLABORATION WORK/SHARING IN PROJECT SPECIFICATIONS AND IMPLEMENTATIONS

Some MS expressed the need to address some future challenges together. MS could collaborate, on a voluntary basis, in tackling their responsibilities areas, depending on their own constraints and priorities. Several domains are open candidates for collaborative work.

The Reference Architecture work has demonstrated that collaboration between the Member States to build something in common is possible. The success of the Reference Architecture work lead to the organisation by Sweden of the Lulea workshop to discuss opportunities for collaboration where 13 MS[3] who have demonstrated interest in collaboration have participated. As concluded in this collaboration workshop, all participating MS recognised the need for collaboration and are interested in collaboration on the future projects; however, all collaboration projects must be supported by a strong business case.

The collaboration activity may take several forms such as:

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[3] The 13 MSs are: BE, CY, CZ, DE, DK, EE, FI, FR, IE, NL, PL, SE, UK.

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- Refining and completing the Reference Architecture horizontally with the services, data and interfaces for all the complete range of Customs systems;

- Concrete collaboration projects with specific value for a group of MS and potential value to all MS (e.g. the Pilot Project for Customs Warehousing).

The above is the way that opens towards a new generation of Customs systems where each service provided in the community could be referenced in within a common framework resulting from collaboration work and at the same time leading to further opportunities of collaboration and sharing.

All collaboration activities are following the principles below:

- Volunteer basis

  It is not mandatory for any MS to join the collaboration activity or to use the product developed by the collaborating MS.

- Collaboration outcome would be available for all

  The final product from the collaboration activity would belong to the entire European Union and would be offered for any MS willing to use it. This collaboration work would either produce common specifications, complete applications or parts of application (web services). It is expected that this type of centrally funded efforts would create a library of knowledge (e.g. design and specifications) or even software components that could be used by willing MS.

- Towards Customs IT Cloud or Customs App Store?

  For the services produced in a collaborative manner, new technologies such as the open source or "cloud" type delivery could be considered for the delivery of the services. This set of services may constitute the "cloud" of customs services that through their use by other MS will reduce the overall cost borne my MS.

The Reference Architecture is a key instrument to allow the collaboration activities and its value has been re-confirmed by the MSs in the Customs Warehousing project.

Many aspects of the collaboration are still to be clarified by the collaboration pilot project as we are still in a discovery phase.

1.5. REFERENCE ARCHITECTURE

The European Interoperability Framework introduces a conceptual model for developing European public services. It presents a building block approach to constructing them allowing service components to be interconnected and promoting the reuse of information, concepts, patterns, solutions and specifications in Member States and at European level. In the same line, the IT Strategy is targeting a new generation of customs systems architected by building blocks of logical services.

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The IT Strategy is based on the assumption that centralisation is not feasible in the coming 10 years or more, except for specific projects or components. If MASP systems are to be based on their majority on distributed architectures it is essential to invest in the convergence of these systems as being the building blocks supporting customs public services.

The Reference Architecture itself is not a standalone project; however, it is the key instrument to allow the realisation of the IT Strategy by breaking the monolithic nature of the systems into a set of logical services or building blocks that can be associated to customs functions supported across the customs processes and so clearly and universally defined and understood.

The Reference Architecture is tightly related to collaboration activities aiming at facilitating cooperation, exchange of information and at achieving a common understanding of IT systems and services, their business value and purpose, and their evolution over time.

The Reference Architecture is not only about services, it is also about data and about IT components and how these relate to and implement the business tasks and processes leading to the fulfilment of the business goals themselves.

The Reference Architecture will be tested in practice within the scope of the "Customs Warehousing Collaboration Pilot" project. Eventually, the Reference Architecture would become an indispensable instrument for any future collaborative development as it provides the following benefits:

- Enable collaboration amongst the MSs by providing:

  - A common reference of services;
  - A common language for discussions and decisions;
  - A customs functional landscape to identify services candidates for sharing and reusing.

- Fix unambiguously the scope of each project in terms of services to be implemented:

  - Associate unambiguously the services with the BPMs functions and requirements (functional specifications).

- Ensure alignment with the business architecture and BPMs:

  - Closely relate to the BPM and build a clear relation between business and IT allowing the management of business changes with an immediate view of their IT impact and the other way around.

- Defines common service and data models which will enable:

  - The emergence of shared national systems using shared components;
  - Normalisation of the market and allow the possibility to have COTS services;
  - Creating services that could be provided throughout a 'cloud' in a flexible manner. The services in the "cloud" can be the result of specific services

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offered centrally by the Commission or by a MS, or from collaboration projects resulting on shared services, or solutions offered by the market.

- Maintain systems in a flexible way identifying the impact of changes and being able to modulate the scope of those changes.

Therefore, the Reference Architecture is essential in terms of driving towards the convergence; by describing in a common place the acknowledged components and services of EU Custom's systems and enabling the harmonisation, reusability, collaboration and cost reduction.

Whatever the way these services are deployed or built, it can only be possible if a common view is built on the structure and characteristics of these services and the Reference Architecture is the necessary instrument to achieve this.

1.6. HARMONISATION OF INTERFACES TOWARDS TRADE – COMMON SPECIFICATIONS FOR INTERFACES

In "The future business architecture for the Customs Union" study conducted for DG TAXUD, "lack of harmonized interface towards Trade" is repeatedly listed as a major limitation of the EU customs systems. The implementation of different external interfaces for the same Customs process throughout the EU has made a significant negative impact on trade. Moreover, the capacity of change of the current systems is challenged and more flexibility is required for future systems. Therefore, it is necessary to agree and implement common message specification and also to provide common access interface for trade.

To address this issue, the IT Strategy aims to harmonise the external domain for new systems (common specifications/collaborative implementations for the external domain) and/or to offer a single access points for trade (SEAP), so as to reduce the number of connections to the customs union for trade.

There are three possible types of harmonisation of external interfaces:

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1. Harmonisation of national interfaces, on the basis of mandatory common specifications for the external domain.

   DG TAXUD is investigating the possibility to test the external domain interfaces during the conformance testing. This would allow the harmonisation of external interfaces where common specifications for the external domain have been provided.

2. External Trader Access for Central Applications.

   In the case of the systems that are provided centrally, the Commission aims to offer a unified external trader access centrally wherever possible. It is foreseen to provide uniform access to the economic operators by offering a single user interface centrally.

3. Single Electronic Access point for Trade

   The Single Electronic Access Point (SEAP) allows traders to lodge their electronic pre-arrival/pre-departure, summary and full customs declarations via one single interface. Trade supports strongly this initiative but a number of MS have expressed divergent views on this issue and a feasibility study[4] performed in 2006 on SEAP for import did not conclude positively. Furthermore, a feasibility study is planned on the Uniform User Management & Digital Signature. Both projects are related as UUM&DS validates authentication credentials and access rights of traders' users and systems so as to allow them to use the central capabilities such as SEAP.

1.7. GRADUAL IMPLEMENTATION

The UCC proposal defines an operational deadline for all the requirements to be realised in the IT systems. It is foreseen to have a gradual approach for the implementation. This gradual implementation practically means:

- Progressive realisation rather than big-bang: It is planned to have the IT systems progressivity go-live one after the other to avoid having all the systems ready in operation in close period. The sequence of the project initiation has been defined carefully taking into account of the following criteria:

  - Business case justification for IT implementation;
  - Feasibility and complexity;
  - Business solution clarity;
  - Dependencies with other projects;
  - Infrastructure requirement and readiness.

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[4] https://circa.europa.eu/Members/irc/taxud/ecustoms/library?l=/electronic_c2007&vm=detailed&sb=Title

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- Phased approach for system implementation: For the implementation of some systems, a phased approach will be undertaken similar to the past NCTS project.

- Incremental adaptation of the new approach: Harmonisation of the interfaces, SOA approach, a new way of working shall not be planned to be fully implemented or adopted at once. They are mainly planned to be implemented starting with new systems. Adopting such an incremental approach allows minimising costs and risks and justifies investments on a project-by-project basis.

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