Design Blueprint

ICS2

Date: 30/05/2018
Doc. Version: 1.20
Document Control Information

<table>
<thead>
<tr>
<th>Settings</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document Title</td>
<td>Design Blueprint</td>
</tr>
<tr>
<td>Project Title</td>
<td>ICS2</td>
</tr>
<tr>
<td>Document Author</td>
<td>CUSTDEV3</td>
</tr>
<tr>
<td>Project Owner</td>
<td>Guido DE JAEGHER</td>
</tr>
<tr>
<td>Solution Provider</td>
<td>Kris DEJONGH (DG TAXUD HoU of B3)</td>
</tr>
<tr>
<td>Chef de File</td>
<td>Carlos GONZALES RUIZ</td>
</tr>
<tr>
<td>TAXUD Project Manager</td>
<td>Bartlomiej BZDELA</td>
</tr>
<tr>
<td>Doc. Version</td>
<td>1.20</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Basic</td>
</tr>
<tr>
<td>Date</td>
<td>30/05/2018</td>
</tr>
</tbody>
</table>

Contractor Information

<table>
<thead>
<tr>
<th>Settings</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framework Contract</td>
<td>TAXUD/2017/DE/160</td>
</tr>
<tr>
<td>Specific Contract</td>
<td>SC18</td>
</tr>
<tr>
<td>Contractor Name</td>
<td>CUSTDEV3</td>
</tr>
<tr>
<td>Contractor Programme Manager</td>
<td>Dimitris EXOUZIDIS</td>
</tr>
<tr>
<td>Contractor Project Manager</td>
<td>Timothée DE BECKER</td>
</tr>
</tbody>
</table>

Document Approver(s) and Reviewer(s):

NOTE: All Approvers are required. Records of each approver must be maintained. All Reviewers in the list are considered required unless explicitly listed as Optional.

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlomiej BZDELA</td>
<td>Project Manager of ICS2 (DG TAXUD/B1)</td>
<td>Approve</td>
</tr>
<tr>
<td>DG TAXUD ICS2 team</td>
<td>ICS2 system owner and system supplier</td>
<td>Review</td>
</tr>
<tr>
<td>QA3 appointed</td>
<td>Quality Assurance and Quality Control Contractor (QA3)</td>
<td>Review</td>
</tr>
</tbody>
</table>

Document history:

The Document Author is authorized to make the following types of changes to the document without requiring that the document be re-approved:

- Editorial, formatting, and spelling;
- Clarification.

To request a change to this document, contact the Document Author or Owner.

Changes to this document are summarized in the following table in reverse chronological order (latest version first).

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Created by</th>
<th>Short Description of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.20</td>
<td>30/05/2018</td>
<td>DG TAXUD</td>
<td>Implementation of Member States Comments</td>
</tr>
<tr>
<td>1.10</td>
<td>27/04/2018</td>
<td>ICS2 Team</td>
<td>Implementing comments and suggestions from the STI PG</td>
</tr>
<tr>
<td>1.00</td>
<td>20/04/2018</td>
<td>CUSTDEV3</td>
<td>Implementing QA3 and DG TAXUD review comments. Submitted for Acceptance (SfA) to Taxation and Customs Union DG.</td>
</tr>
<tr>
<td>0.10</td>
<td>04/04/2018</td>
<td>CUSTDEV3</td>
<td>Implementing DG TAXUD review comments. Submitted for Review (SfR) to Taxation and Customs Union DG.</td>
</tr>
<tr>
<td>Revision</td>
<td>Date</td>
<td>Created by</td>
<td>Short Description of Changes</td>
</tr>
<tr>
<td>----------</td>
<td>------------</td>
<td>------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>0.03</td>
<td>13/03/2018</td>
<td>CUSTDEV3</td>
<td>Implementing DG TAXUD review comments. Submitted for Information (SfI3) to Taxation and Customs Union DG.</td>
</tr>
<tr>
<td>0.02</td>
<td>22/02/2018</td>
<td>CUSTDEV3</td>
<td>Implementing DG TAXUD initial review comments. Submitted for Information (SfI2) to Taxation and Customs Union DG.</td>
</tr>
<tr>
<td>0.01</td>
<td>02/02/2018</td>
<td>CUSTDEV3</td>
<td>First draft. Submitted for Information (SfI) to Taxation and Customs Union DG.</td>
</tr>
</tbody>
</table>

**Configuration Management: Document Location**

The latest version of this controlled document is stored in **CUSTDEV3 repository** and in **CIRCA BC**.
TABLE OF CONTENTS

1 INTRODUCTION ........................................................................................................................................... 7
  1.1 Purpose ................................................................................................................................................. 7
  1.2 Scope ..................................................................................................................................................... 7
  1.3 Target Audience ................................................................................................................................. 7
  1.4 Structure of this document .................................................................................................................. 7
    1.4.1 Reference Documents .................................................................................................................. 8
    1.4.2 Applicable Documents .................................................................................................................. 8
  1.5 Abbreviations and Acronyms ............................................................................................................. 8
  1.6 Definitions .......................................................................................................................................... 9

2 OVERVIEW .................................................................................................................................................. 10

3 TRADER INTERFACE .................................................................................................................................... 12
  3.1 System to system interaction ............................................................................................................. 12
    3.1.1 Economic Operator systems ....................................................................................................... 13
    3.1.2 STI and NTI .................................................................................................................................. 14
  3.2 User to system interaction .................................................................................................................. 14

4 UUM&DS .................................................................................................................................................. 16

5 CCN2 ....................................................................................................................................................... 17

6 COMMON REPOSITORY .............................................................................................................................. 18
  6.1 ENS lifecycle component ................................................................................................................... 18
  6.2 Risk Analysis Orchestration component ......................................................................................... 19
  6.3 Web user interface for MS helpdesk ............................................................................................... 19
  6.4 Web user interface for ICS2 business users ................................................................................... 19
  6.5 Analytics services .............................................................................................................................. 19
  6.6 Shared e-Screening module ............................................................................................................. 19
  6.7 Shared Risk Management support module .................................................................................... 20

7 REFERENCE SYSTEMS .............................................................................................................................. 21
  7.1.1 TARIC3 ........................................................................................................................................... 21
  7.1.2 CRS ................................................................................................................................................ 21
  7.1.3 CS/RD2 .......................................................................................................................................... 21
  7.1.4 ECICS2 ......................................................................................................................................... 21

8 DDS2 .......................................................................................................................................................... 22

9 CRMS2 ...................................................................................................................................................... 23

10 SMART AND SECURE TRADE LANES (SSTL) ...................................................................................... 24

11 ENS CONTAINER STATUS MESSAGE (CSM) ...................................................................................... 25

12 NATIONAL ENTRY SYSTEMS (NES) ...................................................................................................... 26
  12.1 Risk Management System ............................................................................................................... 26
  12.2 Declaration Systems ......................................................................................................................... 26
  12.3 New Computerised Transit System (NCTS) .................................................................................... 26
  12.4 National Arrival / Presentation System .......................................................................................... 26
  12.5 National Control System ................................................................................................................ 26

13 OPERATIONAL AND ORGANISATIONAL ASPECTS .............................................................................. 27
  13.1 Implementing an NTI ....................................................................................................................... 27

14 RELEASES ................................................................................................................................................. 28
LIST OF FIGURES

Figure 1: Overview ............................................................................................................................... 11
Figure 2: Trader Interface System to System ......................................................................................... 13
Figure 3: Trader Interface web user interface ....................................................................................... 15
Figure 4: ICS2 Common Repository ....................................................................................................... 18
LIST OF TABLES

Table 1: Reference documents ............................................................................................................... 8
Table 2: Applicable documents................................................................................................................ 8
Table 3: Abbreviations and Acronyms ..................................................................................................... 9
Table 4: Definitions .................................................................................................................................. 10
Table 5: Releases .................................................................................................................................. 28
1 **INTRODUCTION**

1.1 **Purpose**

The purpose of this document is to describe the design blueprint of the ICS2 system, focusing on the integration of the components located in the different domains (external, shared, common and national). The ICS2 program is complex in the sense that it is envisioned to be implemented by a number of components in a number of domains, interacting with many other new and existing systems. This requires a clear and sound communication and understanding of all stakeholders about the systems involved and their interfaces.

This document is intended as a baseline of all systems relevant to the ICS2 program, their role in the program and their interface with the ICS2 system.

1.2 **Scope**

The scope of this document is to define:

- An insight on how the business processes of ICS2 and other functional requirements are implemented in IT components and interfaces;
- A view on the components and interfaces involved in the different domains (external, common and national);
- Information on the services provided by each component;
- An overview of procedural and operational aspects implied in the set up and functioning of the system.

In addition, the scope of this document is to take into account the different releases of ICS2.

1.3 **Target Audience**

The target audience of this document are all stakeholders in the Member States and DG TAXUD involved in the implementation of ICS2.

Readers are assumed to have a good understanding of general IT architectural concepts and may belong to the following categories:

- ICS2 Specifications and Development team;
- DG TAXUD units responsible for ICS2 application;
- Member States responsible for the implementation of ICS2;
- DG TAXUD B2 unit that is responsible for the infrastructure design and deployment.

1.4 **Structure of this document**

The present document contains the following chapters:

- **Chapter 1 – Introduction** describes the scope and the objectives of the document;
- **Chapter 2 – Overview** provides a high-level overview of the system design;
- **Chapter 3 – Trader Interface** provides a high-level overview of the Trader Interface components;
- **Chapter 4 – UUM&DS**, describes the UUM&DS system;
- **Chapter 5 – CCN2**, describes the CCN2 platform;
- **Chapter 6 – Common Repository**, provides a high-level overview of the Common Repository component;
- **Chapter 7 – Reference systems**, provides a high-level overview of the Reference systems;
- **Chapter 8 – DDS2**, describes the DDS2 system;
• Chapter 9 – CRMS2, describes the CRMS2 system;
• Chapter 10 – Smart and Secure Trade Lanes (SSTL), describes the SSTL system;
• Chapter 11 – ENS container status message (CSM), provides few information of the CMS project;
• Chapter 12 – National Entry Systems (NES), provides a high-level overview of NES components;
• Chapter 13 – Operational and organisational aspects, provides an overview of procedural and operational aspects;
• Chapter 14 – Releases, provides an overview of the components in the context of ICS2 releases.

1.4.1 Reference Documents

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Title</th>
<th>Reference</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>R01</td>
<td>ICS2 Business Process Description</td>
<td>ICS2 BPM L4 Process Description</td>
<td>1.0</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>R02</td>
<td>ICS2 Definitions</td>
<td>ICS2 definitions</td>
<td>1.0</td>
<td>30/11/2017</td>
</tr>
<tr>
<td>R03</td>
<td>ICS2 Business Rules Dictionary</td>
<td>ICS2 Business Rules Dictionary</td>
<td>0.10</td>
<td>16/04/2018</td>
</tr>
<tr>
<td>R04</td>
<td>CRMS2 Architecture Overview</td>
<td>CRMS2 Architecture Overview</td>
<td>1.10</td>
<td>23/12/2016</td>
</tr>
<tr>
<td>R05</td>
<td>GTP Architecture Overview</td>
<td>GTP Architecture Overview</td>
<td>1.00</td>
<td>23/01/2018</td>
</tr>
<tr>
<td>R06</td>
<td>CCN2 R1 Integration Manual</td>
<td>CCN2-CIMA</td>
<td>1.10</td>
<td>11/08/2016</td>
</tr>
<tr>
<td>R07</td>
<td>ICS2.0 Vision</td>
<td>ICS2.0 Vision</td>
<td>4.0</td>
<td>17/11/2015</td>
</tr>
<tr>
<td>R08</td>
<td>ICS2 Design Document for National Applications</td>
<td>ICS2 DDNA</td>
<td>1.10</td>
<td>30/05/2018</td>
</tr>
<tr>
<td>R09</td>
<td>ICS2 Interface Control Document</td>
<td>ICS2 ICD</td>
<td>1.20</td>
<td>30/05/2018</td>
</tr>
<tr>
<td>R10</td>
<td>Transition Strategy &amp; Plan for Import Control System (ICS2)</td>
<td>n/a</td>
<td>1.2</td>
<td>16/11/2017</td>
</tr>
<tr>
<td>R11</td>
<td>Smart and Secure Trade Lanes (SSTL) Pilot Project Business Case</td>
<td>SSTL Business Case</td>
<td>0.6</td>
<td>19/07/2017</td>
</tr>
<tr>
<td>R12</td>
<td>e-SENS AS4 conformant solutions</td>
<td><a href="https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/e-SENS+AS4+conformant+solutions">https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/e-SENS+AS4+conformant+solutions</a></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>R13</td>
<td>ICS2 STI Vision Document</td>
<td>CD3-ICS2-STI-VIS</td>
<td>1.10</td>
<td>31/10/2017</td>
</tr>
<tr>
<td>R14</td>
<td>ICS2 CR Vision Document</td>
<td>CD3-ICS2-CR-VIS</td>
<td>2.20</td>
<td>09/04/2017</td>
</tr>
</tbody>
</table>

Table 1: Reference documents

1.4.2 Applicable Documents

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Title</th>
<th>Reference</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A01</td>
<td>Framework Contract</td>
<td>TAXUD/2013/CC/124</td>
<td>N/A</td>
<td>11/11/2013</td>
</tr>
<tr>
<td>A02</td>
<td>Specific Contract n° 18</td>
<td>TAXUD/2017/DE/160</td>
<td>N/A</td>
<td>20/11/2017</td>
</tr>
<tr>
<td>A03</td>
<td>CUST-DEV3 Framework Quality Plan</td>
<td>CD3-FQP</td>
<td>1.00</td>
<td>30/04/2015</td>
</tr>
</tbody>
</table>

Table 2: Applicable documents

1.5 Abbreviations and Acronyms

For a better understanding of the present document, the following table provides a list of the principal abbreviations and acronyms used.
### Table 3: Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS4</td>
<td>Applicability Statement 4</td>
</tr>
<tr>
<td>CCN2</td>
<td>Common Communication Network version 2</td>
</tr>
<tr>
<td>COFE</td>
<td>Customs Office Of First Entry</td>
</tr>
<tr>
<td>CR</td>
<td>(ICS2) Common Repository</td>
</tr>
<tr>
<td>CRC</td>
<td>Common Risk Criteria</td>
</tr>
<tr>
<td>CRMS2</td>
<td>Customs Risk Management System</td>
</tr>
<tr>
<td>CRS</td>
<td>Customs Reference System</td>
</tr>
<tr>
<td>CSM</td>
<td>ENS-Container Status Message</td>
</tr>
<tr>
<td>CUS</td>
<td>Customs Union and Statistics number</td>
</tr>
<tr>
<td>DDS2</td>
<td>Data Dissemination System</td>
</tr>
<tr>
<td>ECIC2</td>
<td>European Customs Inventory of Chemical Substances 2</td>
</tr>
<tr>
<td>ENS</td>
<td>Entry Summary Declaration</td>
</tr>
<tr>
<td>EO</td>
<td>Economic Operator</td>
</tr>
<tr>
<td>HTI</td>
<td>ICS2 Harmonised Trader Interface</td>
</tr>
<tr>
<td>ICS2</td>
<td>Import Control System 2</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
</tr>
<tr>
<td>IMS</td>
<td>Involved Member State</td>
</tr>
<tr>
<td>JRC</td>
<td>Joint Research Centre</td>
</tr>
<tr>
<td>MRN</td>
<td>Master Reference Number</td>
</tr>
<tr>
<td>MS</td>
<td>Member State</td>
</tr>
<tr>
<td>NES</td>
<td>National Entry Systems</td>
</tr>
<tr>
<td>NTI</td>
<td>National Trader Interface</td>
</tr>
<tr>
<td>OLAF</td>
<td>European Anti-Fraud Office</td>
</tr>
<tr>
<td>OMS</td>
<td>Other Member State</td>
</tr>
<tr>
<td>PSD</td>
<td>preliminary solution design</td>
</tr>
<tr>
<td>RMS</td>
<td>Responsible Member State</td>
</tr>
<tr>
<td>SSTL</td>
<td>Smart and Secure Trader Lanes</td>
</tr>
<tr>
<td>STI</td>
<td>Shared Trader Interface</td>
</tr>
<tr>
<td>TARIC3</td>
<td>Tarif Intégré de la Communauté 3</td>
</tr>
<tr>
<td>TES</td>
<td>Trans-European System</td>
</tr>
<tr>
<td>TI</td>
<td>ICS2 Trader Interface</td>
</tr>
<tr>
<td>UUM&amp;DS</td>
<td>Unified User Management and Digital Signatures</td>
</tr>
</tbody>
</table>

### 1.6 Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicability Statement 4 (AS4)</td>
<td>Open standard for the secure and payload-agnostic exchange of Business-to-business documents using Web services</td>
</tr>
<tr>
<td>Trader interface</td>
<td>The trader interface is responsible for implementing the interactions with the economic operators in the context of the ICS2 program, by implementing the trader relevant part of the ICS2 common specification.</td>
</tr>
<tr>
<td>ENS lifecycle</td>
<td>The ENS lifecycle refers to the different states of an ENS, from pending completeness and complete, to arrived and presented.</td>
</tr>
</tbody>
</table>
The present document refers by the term “sender” as the system sending the technical messages to the TI. This can be a system implemented by the EO lodging the ENS filings or by an IT Service Provider. Sender is understood as a system actor in the ICS2 system context and is the one authenticated and authorised from the system security point of view. [Definition as of ICS2 ICD [R09]]

Table 4: Definitions

2 OVERVIEW

It is assumed that the reader is aware of the functional context of the ICS2 system as described in the ICS2 Business Process Description ([R01]). The most significant events that occur throughout the ENS Lifecycle (as indicated in the ICS2.0 Vision [R07]) are described below:

- Submission of ENS: The Economic Operator lodges an Entry Summary Declaration (ENS) filing to the Customs Office Of First Entry (COFE) through the ICS2 Trader Interface which validates, generates an MRN and forwards to the ICS2 Common Repository;
- Risk analysis: The risk analysis process is the responsibility of the Responsible Member State, taking into consideration the results of e-Screening performed and provided by each Involved Member State and Other Member State, and the manual review and risk mitigation conducted by the respective MS's official, in case of hits generated through the process. This results in conclusion of the risk analysis process by deciding on the risk mitigation actions that may be needed from the side of the EOs or the customs controls that may need to be performed by the competent Customs Offices;
- Submission of Arrival Notification: The Economic Operator submits an Arrival Notification to the competent national systems (Port or Airport community systems). Subsequently that national system will submit the Arrival Notification to the ICS2 Common Repository. It is also possible that the Arrival Notification will be submitted directly from the Economic Operator to the ICS2 Trader Interface;
- Submission of Presentation Notification: The Economic Operator presents the goods (and presentation notification) to the customs authorities. The respective Customs Office is responsible for the processing of the presentation notification, the submission of the presentation event into the ICS2 Common Repository, correlating it with the relevant consignment, and determining which type of controls, if any, need to be performed.

The following diagram gives an overview of the design blueprint of the ICS2 system. It is implemented by several components as described in the sections below. It can be broken down to the following main components:

- An Economic Operator system, optionally using a IT service provider, which implements the necessary AS4 access point to be able to communicate with the trader interface;
- A Trader Interface, providing both system to system interactions and a web user interface. At least the shared trader interface (STI) will be developed, and member states have the option to implement their own national trader interface (NTI);
- The UUM&DS system used by both the NTI and STI for cross border identification, authentication and authorization of Economic Operators or their representatives or even their IT Service Provider if they use one;
- The ICS2 Common Repository managing the ENS lifecycle, the risk analysis process, the analytical services, and the opt-ins for a shared e-Screening module and a shared risk management support module;
- The National Entry Systems (NES) grouping all relevant member state systems;
- The Customs Risk Management System (CRMS2);
- The Smart and Secure Trader Lanes (SSTL);
- The ENS-Container Status Message system (CSM);
- Reference systems and their publication on the Europa website (DDS2);
- Risk Management Support (RMS);
- eScreening module.

Figure 1: Overview
3 TRADER INTERFACE

The trader interface is responsible for implementing the interactions with the economic operators in the context of the ICS2 program, by implementing the trader relevant part of the ICS2 common specification. The trader interface consists of several components. First there is the distinction between the shared trader interface (STI) and the national trader interface (NTI). Member states can select to opt-in to use the STI as the implementation of the Trader Interface, or they can select their own national implementation as NTI. Secondly the trader can select to use a system to system interface or a web user interface.

To keep the diagrams and explanation clear, first the system to system interaction with the trader will be discussed, both for the STI and NTI. Secondly their web user interface is discussed.

3.1 System to system interaction

The system to system interaction between an Economic Operator and the ICS2 system is implemented by several components as described below. It can be broken down to the following main components:

- An Economic Operator system which incorporates the necessary AS4 access point to be able to communicate with the trader interface;
- The shared and national trader interfaces, each having the necessary AS4 access points as interface to the AS4 access point of the EO system, with their trader message archive and possibly a reference data cache;
- The UUM&DS system used by both the NTI and STI for cross border identification, authentication and authorization of the Sender registered for submitting messages to the TI.

It is important to note that the Economic Operators may make use of IT Service provider’s services for the sending of messages containing ENS filings. In this case and as is common practice today in many MS the authentication and authorisation to access the system is done for this ITSP who is sending the messages on behalf of the EO.

The above is to apply only to system to system interactions and due to difficulty in the operational practice to have the EO authenticating while the ITSP is the one accessing the system.
3.1.1 Economic Operator systems

The Economic Operator systems are responsible for sending and receiving ICS2 messages from and to the Trader Interface using AS4 as a business message exchange protocol as profiled in the eDelivery AS4 specifications (also known as e-SENS AS4). A mandatory component in this system is the AS4 access point software implemented by the EO itself or by an IT Service Provider and which implements these specifications and has passed the conformance testing according to the e-SENS AS4 profile. A list of such vendors is made available by CEF eDelivery as defined in [R12].

In order to send and receive messages the sender needs to be registered by Customs. This registration authorises the Economic Operator to exchange messages with the STI/NTI. It does not represent a Customs role on itself but an operational role in the systems security administration. Optionally, an
Economic Operator can select an IT service provider to assume this operational role and be responsible for sending and receiving the necessary ICS2 messages to the ICS2 trader interface. In this case the IT Service Provider must be registered by Customs and will be the one authenticated and authorised from the system security perspective. This does not represent a Customs role on itself but an operational role in the systems security administration.

3.1.2 STI and NTI

The STI and NTI provides the services required by the ENS filing processes, be it a filing, amendment or invalidation. Such filing received by the STI or NTI will be validated both syntactically (the format of the message) and semantically (the message content must follow the rules and conditions as specified in the ICS2 common specifications) relying on data obtained using the reference data services of the TARIC3, CRS, CS/RD2 and ECICS2 IT Applications, loaded in a high available cache to allow very fast access. Successfully validated filings are subsequently forwarded to the ICS2 CR system component for further validation. In case of a new ENS filing a unique MRN is created.

The STI and NTI provides the notification services as well that are required to process notifications and requests from the ICS2 CR system as obtained by the STI CR interface and forward them to the Economic Operators taking into account the preference of the Economic Operators concerning notifications. Through these preferences, Economic Operators can indicate through which channel they want to be notified (the user interface or the system-to-system interface, and in case of system-to-system the specific access point to be contacted through), and if they want to subscribe to optional notifications. It must be noted that by default, responses and notifications are sent to the communication channel (and access point in case of system-to-system interaction) by which a trader initiated the ENS filing. Only in case this is unknown, the preferences are used to identify this. Preference management will be available via the web user interface only as of release 2 (see section 14). Until then and given the limited number of EOs involved in release 1, the trader preferences will be managed via operational communication with the help desks.

In order to address the response messages the Trader Interface must keep track of the identity of the sending party as received in the original message. This allows it to match a functional reply to the receiving party of destination when it takes the sending role.

A mandatory component in NTI/STI is the AS4 Access Point which is responsible for sending and receiving ICS2 messages from and to the traders following the eDelivery AS4 profile specification to ensure interoperability and easy adaptation by the Economic Operator systems as it provides the implementation of the reliability and non-repudiation requirements in a standardized and well documented way. Each trader interacting in a system-to-system way with ICS2 will have one or more such AS4 Access Points, and each TI (STI and NTIs) will have one Access Point. The trader must declare the Access Point to each TI (STI and NTIs) to allow the TI to resolve the physical address when establishing the 2-way TLS secured communication.

The AS4 Access point at TI side will receive and send all ICS2 messages but will not store them long term. This is the responsibility of the STI and NTI Message Archive, which will store the sealed messages archive in order to keep a historical repository of all received messages.

To allow the MS helpdesk user to consult the status of sent and received messages in case of problems, they will have access to a web user interface. However this UI will only allow direct access to messages in the transactional database and not to the Historical Message archive which is to be consulted via a call TAXUD service desk.

3.2 User to system interaction

The ICS2 trader interface web user interface offered to an Economic Operator is implemented by the shared and national trader web interfaces. In the case of the shared trader interface, this web interface will be provided as part of the Generic Trader Portal, a DG TAXUD project that provides a unified portal to the traders for a number of business domains (INF, EBTI, CDMS and now ICS2). The UUM&DS system will manage cross border identification, authentication and authorization of Economic Operators or their representatives for both the NTI and STI.
The STI and NTI web interfaces provide the web capabilities to the Economic Operator required by the ENS filing processes, be it a filing, amendment or invalidation. Such filing drafted and saved in the STI or NTI web interface will be validated using the same mechanisms as the system to system interaction and a response to the Economic Operator will be visible in the notification list of the web interface, including the generated MRN in case of a first-time registration. As in system to system interaction, successfully validated filings are subsequently forwarded to the ICS2 CR system component.

The STI and NTI web interfaces provide the services that are required to process notifications and requests from the ICS2 CR system and show them to the Economic Operators in the notification list of the web interface.

They also provide services to allow EO to manage their communication preferences, indicating through which channel they prefer to be notified (the user interface or the system-to-system interface, and in case of system-to-system the specific access point to be contacted through), and if they want to subscribe to optional notifications. It must be noted that by default, responses and notifications are sent to the communication channel (and access point in case of system-to-system interaction) by which a trader initiated the ENS filing. Only in case this is unknown, the preferences are used to identify this.

The STI web interface will be built as a module in the Generic Trader Portal (GTP). The Generic Trader Portal system is a communication platform between the Traders and the Customs Authorities allowing information exchanges on multiple business domains (Information Sheets INF for Special Procedures, Binding Tariff Information, ...). In the context of the ICS2 STI web interface, it will manage all web user interface submissions from the traders and notifications towards the traders.

To allow the MS helpdesk to monitor the status of sent and received messages from the NTI and STI web user interface, they will have access to a web user as well. This web interface allows to monitor messages from traders sent both from the system to system interaction as from the web user interface. For the STI web interface, the GTP provides additional monitoring capabilities.
4 UUM&DS

ICS2 STI will use UUM&DS for cross border identification, authentication and authorization of Economic Operators or their representatives for user-to-system interactions and one of these or their IT Service Providers (when the EO chooses to outsource the sending of messages to an IT Service Provider) as the Sender of messages, for system-to-system communication.

For the web user interface used by the trader, UUM&DS will be used to allow federated identification and authentication of trader users.

For the system-to-system communication, Sender authorisation will be done through the use of a certificate that will also be used to seal the messages sent to the TI. The AS4 access point will validate that the certificate is provided by a Trusted Certificate Authority known by UUM&DS. In addition UUM&DS services will be used to validate that the certificate belongs to the Sender (EO, Customs representative or IT Service Provider) and that this Sender is authorised to exchange messages with ICS2. To this end Senders intending to interact with ICS2 will have to upload their certificate(s) in order to validate them through UUM&DS.

In principle there will be two ways for registering a Sender via UUM&DS:

- The federated model: in that case the MS is responsible for registering the EO and to implement a SAML interface that will be invoked by UUM&DS as described in the MS TSS of UUM&DS published to MS.
- The second way is to register centrally (in a UUM&DS module) the EO and their certificate.

---

1 A Trusted Certificate Authority corresponds to a CA belonging to a list of CAs agreed as accepted by Customs Authorities of any MS or by the EC for the access to ICS2 system via the TI.

2 UUM&DS federates this validation service to the Member States unless they select to use the central UUM&DS solution. It should also be noted that it will be possible to upload multiple certificates simultaneously for the same purpose and same user.

3 An overview of the process was communicated in the technical annexe of the UUM&DS Vision document currently under MS review.
5 CCN2

CCN2 is the trans-European exchanges platform and will be used to expose the service operations between the ICS2 TI (NTI and STI) and the ICS2 Common Repository, as well as between the ICS2 Common Repository and the NES ([R06]). As well it is used as a federated authentication and authorisation mechanism to allow member state users to access the ICS2 STI and ICS2 CR web interfaces.

In the context of service operations, the CCN2 platform offers the added value of exposing asynchronously web services using the one-way message exchange pattern to ensure a decoupled communication between the parties, as well as other added value services such as security, federated governance, monitoring, interoperability and auditing.
6 COMMON REPOSITORY

The ICS2 Common Repository system is the common domain IT component of the ICS2 system that will provide the common referential and storage of the ENS data (including lifecycle validation), that will make the relevant ENS data (individually or merged by consignment) available to the MS customs and that will make the consolidated ENS data available for risk analysis to the relevant MS. It will also collect and share the risk analysis results amongst MS, and provide data analytic tools.

6.1 ENS lifecycle component

The ICS2 CR ENS lifecycle component implements all the activities required by the ENS Lifecycle and Risk Analysis Preparation groups of processes. The entities managed by this component are the ENS filing, the full ENS (either incoming from HTI or resulting from the linking process), ENS goods item, control decisions, arrival notifications and presentation results. As is the case for the STI and NTI, the semantic validation of the received ENS filings relies on data obtained using the reference data services of the TARIC3, CRS, CS/RD2 and potentially the ECICS2 IT Application, loaded in a high available cache to allow
very fast access. Such semantic validation is repeated here (even though it should be done already in the TI) to further ensure data coherence in the ICS2 CR.

### 6.2 Risk Analysis Orchestration component

The ICS2 CR Risk Analysis Orchestration component implements all the activities required by the Common Repository to orchestrate the Risk Analysis execution by the RMS and the E-Screening by the identified IMS and to report the results.

This component communicates mainly with NES but can also send notifications to the ICS2 TI (for example for requesting additional information or reporting the completion of risk analysis).

ENS filing data related to the ENS lifecycle and for Risk Analysis is retained for this purpose up to 2 years from the moment of the ENS filing.

### 6.3 Web user interface for MS helpdesk

The ICS2 CR web user interface for MS helpdesk allows access to MS helpdesk users to execute ENS queries, view business rules, view OMS parameters, view timers and consult business statistics.

### 6.4 Web user interface for ICS2 business users

The ICS2 CR web user interface for ICS2 business users allows access to ICS business users from MS and DG TAXUD to execute ENS queries, view and configure business rules, view and configure OMS parameters, view and configure timers and consult business statistics.

### 6.5 Analytics services

Analytics services will be provided as a set of components that DG TAXUD and member states users can use (as indicated in the ICS2.0 Vision [R07]). These components will provide capabilities to enable real-time analysis, data analysis and analytical products. These products will provide the necessary IT solutions for the analysis of the ENS lifecycle data: configure rules, evaluate efficiency of risk rules, test new rules, analyse historical data, build learnings from the past events and results (i.e. controls). This component will also provide a capacity to enable fast automated enrichment of ENS to support the risk analysis process of the MS. It will provide a real-time query engine that will pre-process and enrich ENS data with information that can be selected from the ENS historical data stored in the Common Repository.

For each ENS partial/full submission automatic enrichment of the ENS data for the purposes of risk analysis will be performed at common level. This requires real-time access to EU ENS historical data.

The data analytics component will provide functionalities for analytics techniques on ENS data for risk management purposes. This is required to enable risk evaluation, the identification of new common risk criteria, risk rules and patterns, analytical products to support risk analysis of ENS by the RMS and intelligence building.

The analytics services are not yet fully evaluated and will be covered by a dedicated project starting with an inception phase and vision document.

### 6.6 Shared e-Screening module

A shared e-Screening module will be provided as an optional component that member states can use (as indicated in the ICS2.0 Vision [R07]). This component will provide IT services to execute the e-screening process, i.e.

- run the common risk criteria (CRC) category 2 rules against national sensitive data;
- allow MS users to configure the rules used;
- allow MS users to upload the necessary sensitive data encrypted using a secured channel and to store the data in a secure and segregated environment.

A user interface will also be provided to manually assess the outcomes the automated analysis, to mitigate the risks.
The component will implement the services to interact with the ICS2 CR who will orchestrate the feedback of the results from the IMS to the RMS that needs that assessment to complete its analysis. Another service will be also provided to send the outcomes of the automated analysis to the IMS national system that is running the e-screening process i.e. manual risk mitigation and decision. (This might be necessary in case the MS decides to carry out the manual assessment in already existing national screens/user interfaces and would prefer to use this solution).

The shared e-Screening module will not be covered in any of the incoming 3 releases but potentially in a 4th release which would have their own dedicated project

6.7 Shared Risk Management support module

A Shared risk management support module will be provided as an optional component that member states can use (as indicated in the ICS2.0 Vision [R07]). This component will provide IT services to execute automated part of the common risk criteria (CRC) category 1 rules against the national or trans-European data stored in the Common Repository, define the risk scores and provide the outcomes of that analysis to the MS risk management system for manual mitigation. In this case, the opt-in MS will need to develop the web user interface that will be used for the manual mitigation.

The shared risk analysis support module will be analysed and covered as part of the second release of ICS2 CR.
7 REFERENCE SYSTEMS

The ICS2 system interacts with several central systems to consult reference data used during validation.

As not all these systems are high available, and to reduce the dependencies with external systems, the option selected for the ICS2 STI and the ICS2 CR is to synchronize these reference data (daily or in any other configurable frequency) in a high-available persistent storage. This information is then loaded in a high available cache to allow very fast access to these reference data during validation.

For the ICS2 NTI and NES replication mechanisms towards member states applications exist and can be used by the member states to acquire up to date reference data.

For the traders the data of the reference systems will be shared over DDS2 as explained in section 8 unterhalb.

The following reference data systems are used.

7.1.1 TARIC3

The TARIC3 IT application is an existing DG TAXUD application that manages commodity codes and tariff measures based on goods classification, and implements services used by the ICS2 system to consult and validate goods codes.

7.1.2 CRS

The CRS IT application is an existing DG TAXUD application and implements the services to validate the necessary authorisations and the trader information required by the ICS2 STI processes defined above.

This application is a reference system centralising up to date information of traders managed by other acquisition points such as the EOS IT application that is the acquisition point managing trader contact information and the unique holder of EORI number. For the ICS2 STI system, the CRS IT application will provide a service to retrieve the EORI information of a trader to be stored in the local cache.

Once an ENS filing has been registered, the ICS2 STI system will not subscribe to the lifecycle events (revoke, suspend, ...) of the underlying EORI information to update the ENS filings.

7.1.3 CS/RD2

The CS/RD2 IT application is an existing DG TAXUD application and implements the services to provide and validate reference data required by the ICS2 STI and CR processes defined above. The ICS2 code lists will be added to this application and existing ones (country codes, custom office lists, ...) will be reused.

7.1.4 ECICS2

The European Customs Inventory of Chemical Substances (ECICS2) IT application is an existing DG TAXUD application and lists chemical names in a number of EU languages (currently mainly eleven) along with their tariff classification in the European Community's Combined Nomenclature (eight-digit CN codes). Each product listed in ECICS is identified by the CUS number, assigned by DG Taxation and Customs Union, which is an easy identifier to search the database and to communicate with Customs. The CUS numbers received in the ENS filings could be potentially validated against this database.
8 DDS2

The DDS2 application is used to publish data on the Europa website. It is used in the context of ICS2 to publish the necessary reference data to be used by the EO systems:

- The TARIC DDS2 module allows to search and validate goods codes;
- The EOS DDS2 module allows to validate EORI numbers;
- In the case of CS/RD2 code lists, the data relevant for the Economic Operators is going to be made available via generic XML to download. Moreover, DG TAXUD is studying the possibility to implement a new module for ICS2 code lists itself, including the customs office codes, dangerous codes, UN/LOCODE, UN/ECE rec 21, UN/ECE rec 28 and others;
- The ECICS DDS2 module allows to search for chemical substances and their CUS code.
9 CRMS2

In the area of the external border control by Customs, the Risk Information Form (RIF) and (later) Customs Risk Management System (CRMS) functionalities have been in place for almost 15 years. The system was computerised in 2005 and has evolved regularly to adapt to new risk analysis requirements and needs.

The new version of the Customs Risk Management System (CRMS2) will provide a support for the end users (customs officers at the border and national risk targeting experts) to collaborate between MS Customs offices and between them and the European Commission about a potential or actual risk (see [R04]). It is a human to human system that can help the decision-making process to decide on controls or to report seizures to inform other MS. It also provides a support for MS to work together on the elaboration of new risk criteria and to help organise common activities in case of crisis to ensure a common and coordinated approach. It is a collaborative platform. The actual risk analysis and management engines are under national responsibilities and deployed separately in each MS.

It is envisioned that the new CRMS2 system will interact with the ICS2 CR system using the same interfaces which are offered to NES systems to query and retrieve ENS data when needed. This will be further clarified as part of elaboration phase of CR Release 3 and the CRMS2 project.
10 Smart and Secure Trade Lanes (SSTL)

The Smart and Secure Trade Lanes (SSTL) pilot project was launched in 2006 by the European Union and the People's Republic of China (PRC) to test specific safety and security related recommendations of the WCO SAFE Framework of Standards (see [R11]). The main aim was to test security measures applied to containers, to facilitate ‘Customs-to-Customs’ data exchange, to determine joint risk rules and to mutually recognise customs controls and trade partnership programs.

The SSTL pilot project is organised in the form of trade lanes between economic operators in the EU Member States on one side and economic operators in China and Hong Kong on the other side. The goods moved within the trade lane are transported between the participating ports. Information about the goods is exchanged between the customs authorities participating in the pilot project. Export declaration data is sent by the country of export before loading the goods into the container which will carry them to their final destination. Before the goods leave, the importing country may ask to perform control of the goods based on the risk analysis carried out on the data received from the export country. The export country would inform the import country about the results of control. In case the goods are controlled upon their arrival to the import country, the later would inform the export country of the results of control. The pilot project will consist of two components:

- International exchanges between the EU and China and Hong Kong;
- EU internal exchanges between the EU MS and Commission.

In the context of this last component, it is envisioned that the SSTL Repository will expose consultation service to the ICS2 repository, allowing ENS filings to be enriched with SSTL data. This will be further clarified as part of elaboration phase of CR Release 3 and the SSTL project.
11 ENS CONTAINER STATUS MESSAGE (CSM)

The ENS-Container Status Message (CSM) pilot project brings together DG TAXUD and MS risk experts, the JRC and OLAF, exploring how the additional supply chain visibility provided by container status messages (CSM) could be exploited in real-time customs risk analysis. Based on the experience gained in the project, and the research work and prototypes developed by the JRC, this project developed a preliminary solution design (PSD) for the possible systematic integration of CSM data in real-time risk management. The PSD identifies three functional layers for real-time processing of CSM data against ENS extracts or other customs data. The third functional layer – analytics services – is where the integration with ICS2 and ENS business workflows happens. This will be further clarified as part of elaboration phase of CR Release 3 (and as part of data analytics), as described in the ICS2 CR Vision document ([R14]).
12 NATIONAL ENTRY SYSTEMS (NES)

The National Entry Systems (NES) is a generic name used for the national applications of the Member States that cover the following functionalities: processing of the ENSs at the Customs Office of First Entry or Subsequent Customs Office of Entry, risk analysis, arrival of means of transport, presentation of goods, control of goods.

The following national applications are identified as relevant in the context of ICS2.

12.1 Risk Management System

The national risk management system is responsible to provide the services as defined in the ICS2 Design Document for National Applications ([R08]) to communicate e-risk analysis and e-screening analysis requests and results with the ICS2 CR application.

12.2 Declaration Systems

National Declaration Processing Systems (NDPS) manage customs declarations (except transit declarations) and declarations for Temporary Storage. These systems will specifically support the submission of ENS data to CR that was extracted from a given customs declaration (except transit declarations) or a declaration for temporary storage (Article 130 UCC).

National Import Control Application (NICA) systems might be considered required as well by some Member States to implement functionalities to support the submission of ENS data extracted from a given customs declaration or a declaration for temporary storage (Article 130 UCC), and to submit ENS declarations received to the ICS2 CR.

12.3 New Computerised Transit System (NCTS)

This system is foreseen to extract ENS data from declarations submitted to it (Article 130 UCC), and submit them to the CR. The decision, on which system will implement the aforementioned functionalities, is entirely a national responsibility.

12.4 National Arrival / Presentation System

The system(s) will support the submission of the Notifications of Arrival and Presentation Events to the ICS2 as defined in the ICS2 Design Document for National Applications ([R08]). The submission of the Notification of Arrival to the ICS2 is also offered directly to the Economic Operators via the ICS2 TI.

12.5 National Control System

These systems will support the reception of control recommendations and ENS incorrect state messages as defined in the ICS2 Design Document for National Applications ([R08]).
13 OPERATIONAL AND ORGANISATIONAL ASPECTS

13.1 Implementing an NTI

Member states have the option to opt-in on the shared project for the delivery of the Shared Trader interface in collaboration with other MS and under the responsibility of the Commission as system supplier. In case a member states decides to develop at the national systems’ level a national trader interface (for the gathering of ENS data from trade) based on the common functional and technical specifications, they will have to:

- Implement the necessary services provided to the traders, as defined in the ICS2 Interface Control Document ([R09]);
- Implement support for MS helpdesk;
- Collect and share ICS2 related statistics;
- Implement the archive of trader messages;
- Implement the necessary services to interact with the ICS2 Common Repository, as defined in the ICS2 Design Document for National Administrations ([R08]).
14 RELEASES

The ICS2 Transition Strategy [R10] introduces the concept of a phased rollout of ICS2, based on different releases of TI and CR. This section gives an overview of each release in terms of supported components. It must be noted that the detailed functionality of the components per release is described in the ICS2 Transition Strategy [R10].

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release 1</td>
<td>Postal by Air pre-loading and Air express pre-loading</td>
<td>The ICS2 STI component for release 1 including • System to system interface • ICS2 message archive • Web user interface for MS Helpdesk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The ICS2 CR component for release 1 including • ENS lifecycle component • Risk analysis orchestration component • Web user interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Integration with reference systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The ICS2 DDS2 module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UUM&amp;DS S2S support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NES for release 1</td>
</tr>
<tr>
<td>Release 2</td>
<td>In addition to Release 1, full Postal by Air, Air express and Air cargo (general)</td>
<td>The ICS2 STI component for release 2, including • System to system interface • ICS2 message archive • Web user interface for MS Helpdesk • Web user interface for traders including preference management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The ICS2 CR component for release 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NES for release 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The shared ICS2 Risk analysis support module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The ICS2 Analytics services for release 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The integration of ICS2 with CRMS2</td>
</tr>
<tr>
<td>Release 3</td>
<td>In addition to Release 2, Maritime, Rail and Road</td>
<td>The above components for release 3, including integration with SSTL and CSM</td>
</tr>
<tr>
<td>Release 4</td>
<td>The implementation of the e-Screening support functions of ICS2 for the implementation of the Common Risk Criteria and standards of category 2 (i.e. CRC2).</td>
<td>The above components</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The ICS2 e-Screening module</td>
</tr>
</tbody>
</table>

Table 5: Releases