

Technical Overview



Customs Engine (CuE) is an information system for processing customs documents and automating customs processes to **make paperless customs office a reality**.

CuE helps to make the system

- ▶ **easier to use for traders**
- ▶ **easier to use for custom officers** (CuE can process documents without the intervention of customs officers)
- ▶ **faster**, by speeding up the acceptance of customs documents
- ▶ **cost efficient** and **secure**

If some inspections cannot be carried out automatically, CuE hands over the processing to the customs officers. This kind of flexibility minimizes the workload and increases the overall productivity of a customs office.

From lodging to archiving, CuE covers the whole lifecycle of most customs documents, such as **customs declarations, summary declarations, TIR vouchers, and export notices**.

Design Principles

- ▶ CuE has been designed from the ground up as an **internationally usable system**
- ▶ CuE is **flexible and highly configurable** with minimal number of country-specific issues.
- ▶ CuE supports **multi-language user interfaces**
- ▶ CuE provides **simple and standard interfaces** for communicating with other (supporting) systems.
- ▶ CuE is based on **Service-Oriented Architecture (SOA)** principles.

CuE uses **processing rules** that encapsulate the business logic of document validation. The rules are small scripts written in a domain-specific language that operate directly on XML documents. Since there is almost no validation-related logic in the program code, functional changes can be made in processing rules without requiring custom IT development, thus making the system highly configurable.

CuE has **extra value in EU countries**. The currently implemented processing rules are mostly common to all EU member states and can be used as the baseline for analysis.

CuE is highly automated. The primary design principle was to automate document processing as much as possible. Since customs procedures deal with complex issues, however, automating everything is not always useful. From the system design point of view, if a task cannot be automated easily, it will be delegated to a customs officer.

CuE – surest way to compliance!

- ▶ **The most reliable software of its kind** – CuE has successfully passed a continuous, three-year, real-life testing period in Estonian border customs offices
- ▶ **Developed and tested in "e-Estonia"** – the homeland of Skype and the first ever e-voting and e-government systems in the world
- ▶ Supports fully **WCO SAFE Framework** and **Revised Kyoto Convention**
- ▶ **Implements EU legislative acts in business rules** – almost 80% of currently implemented business rules can be reused in other EU member states
- ▶ Can be **flexibly implemented module by module** without stopping the operations
- ▶ Can be **transparently customized** after implementation
- ▶ **Has the best cost-benefit ratio in the market** – CuE offers high-end functionality while being less expensive than custom-made or competing solutions
- ▶ Developed by Cybernetica AS, a company with international co-operation experience and a **long track record of highly reliable software**
- ▶ Saves **public money** through cost-efficiency
- ▶ Has an **experienced back-up team** to provide highly professional assistance during the implementation process

CuE involves clients as much as possible. CuE provides a web-based interface where clients can do most of the processing of their documents.

CuE copes with ever-changing business rules and can handle a great variety of declarations during procedures as different as import and export.

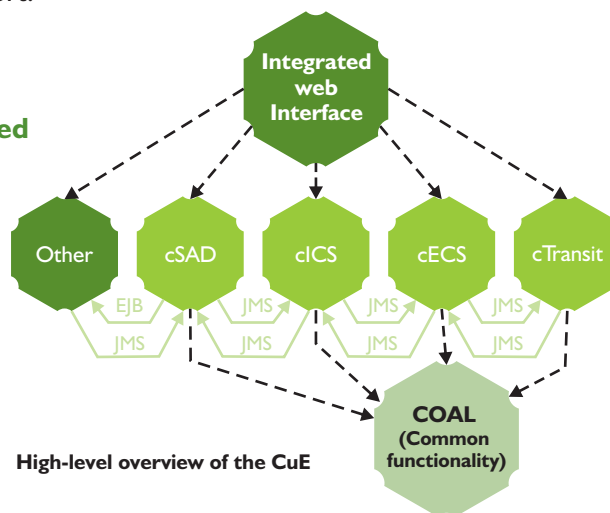
Development Principles

CuE is built upon **independent and interconnected subsystems**, each of which encapsulates the complete processing logic of a particular type of document.

Every subsystem can be used independently, for example, the cECS subsystem can be easily used with other declaration processing systems besides our own.

The subsystems communicate by calling services and sending messages using standard interfaces, such as JMS, EJB, and SOAP. All CuE subsystems publish information about document-related events (such as changes of state) to the enterprise service bus (ESB) and implement services that can be called by the ESB. This enables **process orchestration** – events can trigger business processes that call different services in different subsystems.

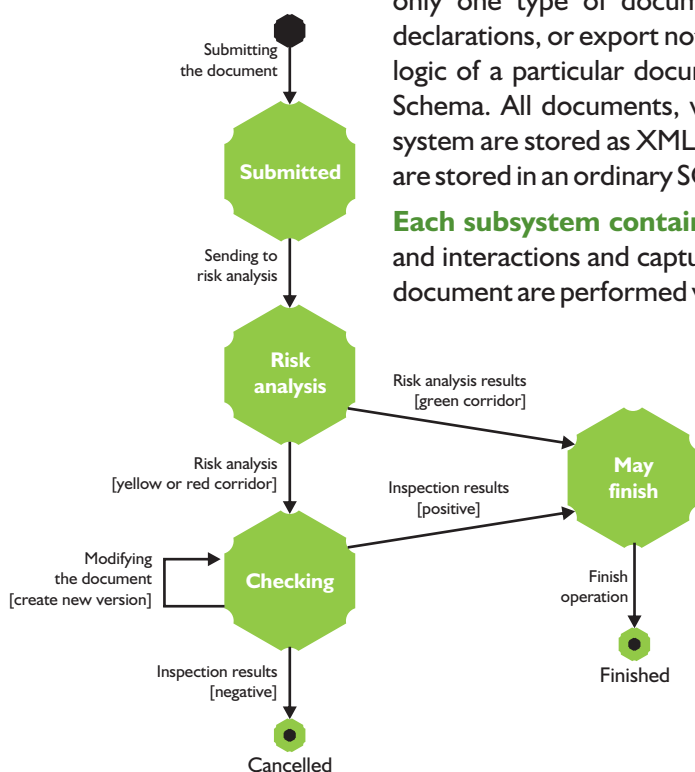
All applications share some common functionality – for example, the XML document processing functionality, user interface generation, the reporting subsystem, interfaces to the risk analysis, workflow management, and permit management subsystems, etc. Messaging is used in many places for asynchronously connecting the subsystems.



The subsystems are document-centric, in that each subsystem processes only one type of document (for example, customs declarations, summary declarations, or export notices). Each subsystem encapsulates the full processing logic of a particular document, which itself is expressed in terms of the XML Schema. All documents, whether being edited by clients or processed by the system are stored as XML. Documents that have reached a certain internal state are stored in an ordinary SQL database.

Each subsystem contains a state machine that describes all possible states and interactions and captures the lifecycle of a document. All operations on the document are performed via the state machine.

The Schema and state machine are static components of the sub-system. Furthermore, two dynamic components give the system its flexibility: **profiles and processing rules**. A profile selects subtypes of the main declaration Schema appropriate for particular customs procedures, restricting the data that can be entered. For example, a profile for export declarations makes certain data elements mandatory and hides other data elements. There are also profiles for importing, warehousing, for procedures with economic impact, etc. Every profile has a **validity timeframe**, so when the legislation changes and some other fields become mandatory, it is easy to alter the profile to achieve

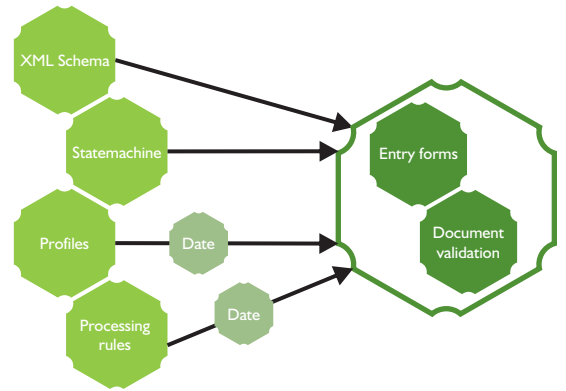


State machine example

the required effect. The old profile is also retained and applied to all old declarations when they go through the post-entry phase. The profiles also define automatically generated entry forms.

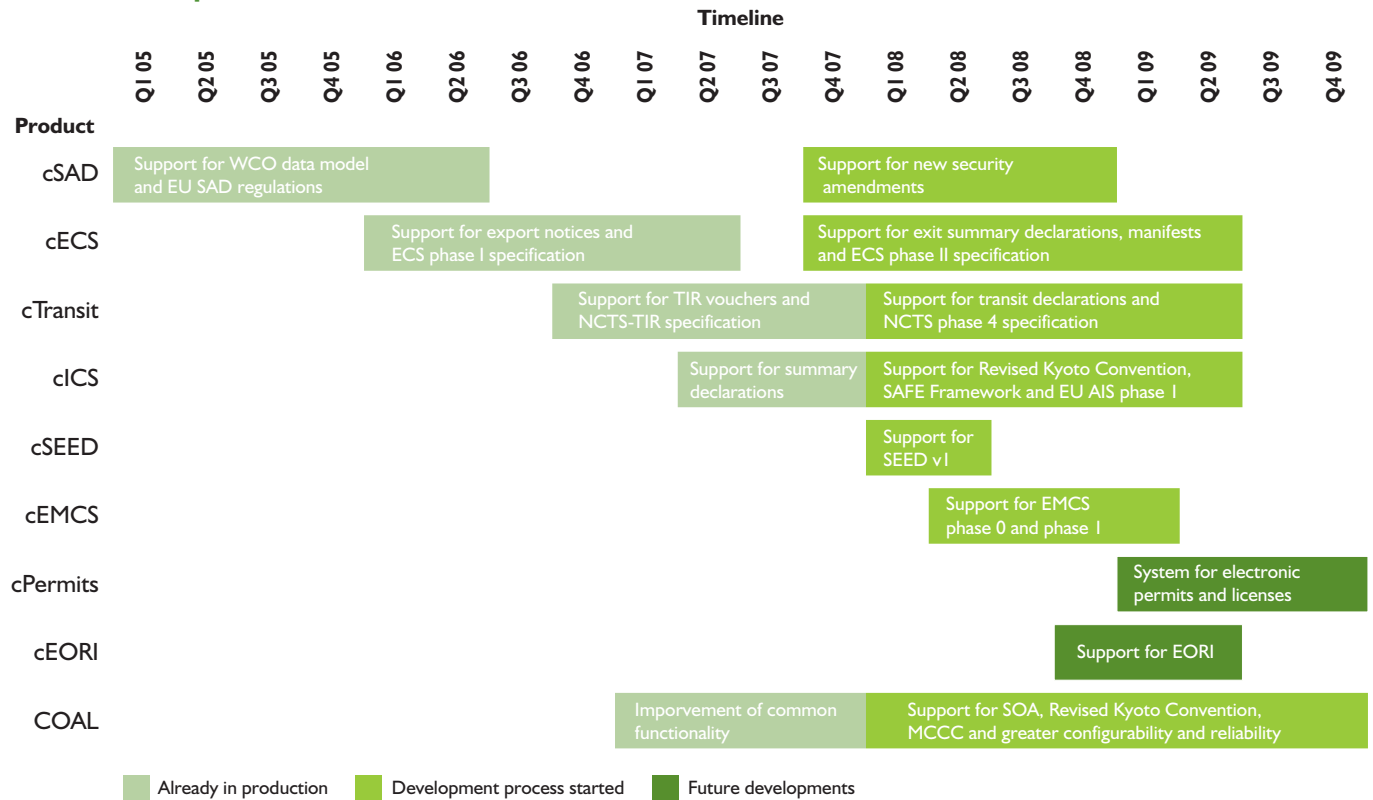
Processing rules can be updated dynamically, without interrupting the operation of the system. In addition, the rules have a certain validity period, so the system can be easily changed when there is a change in legislation.

Clients are free to maintain the profiles and processing rules, though Cybernetica's analysts usually provide an initial set of consistent profiles and processing rules that implement current legislation. The profiles and processing rules enable to configure most of the system without requiring custom IT development.



On-the-fly configurable document-centric architecture

Future Development Plans



CuE development roadmap

CuE has been in use in Estonian customs offices for more than three years, functioning with **outstanding reliability**.

In development of CuE Cybernetica has followed the e-Customs related activities in the EU. Cybernetica's strategic partner, the Estonian Tax and Customs Board (ETCB) is holding regular meetings on the MASP topics and is distributing the relevant information.

As Cybernetica works closely with the ETCB to help them to fulfill the requirements of the MASP, for the next couple of years **MASP becomes the development roadmap**. Even though Cybernetica is developing more subsystems, old systems are going to be re-released to bring them up-to-date with new features and enhance the integration between the subsystems. The development has stayed ahead of deadlines set by the MASP.



Further information

Visit www.customsengine.eu for more information about CuE, www.cybernetica.eu for more information about the company, or contact:

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About Cybernetica AS

Cybernetica is a private research and development company, original equipment manufacturer and solutions provider active in the field of Information and Communication Technologies (ICT).

We offer a wide range of original communication, visual navigation, light signalling and telematics products as well as off-the-shelf and tailored hardware/software system solutions. Our services range from auditing of information systems to development, manufacturing, installation and maintenance of complex application specific secure distributed systems including integrated surveillance systems for border security applications, e-customs solution for Customs Authorities and comprehensive information systems for medical laboratories.