D10.3 Final report on phase one developments of the Felixstowe demonstrators - summary

1 Executive summary

This document describes how the integrated solution of a collaborative Global Supply Chain Visibility Tool (data pipelines) interacts with government authorities and other Supply Chain stakeholders. This is being conducted in the CORE project through the use of defined use cases within the Living Labs that have been designed to showcase the capabilities of the solution and validate that it successfully resolves the key challenges that have been identified within the CORE Description of Work (DoW). This task will implement a collaborative Global Supply Chain Visibility tool, as described in the Description of Work.

Within Work Package 10, the global supply chain visibility tool is the seamless, integrated data pipeline. The WP10 goal is to develop and demonstrate four data pipelines, integrate them with two UK data hubs and at least one hub outside the UK, deliver commercial supply chain visibility as a consequence of these data pipelines in an import and an export scenario and demonstrate that the resultant data sharing and supply chain visibility improves regulatory supervision.

Description of Deliverable

Demonstrate CORE concepts in an import and export trade lane centred on the Port of Felixstowe, UK. The initial import lane runs from Yantian, China, to Felixstowe for the UK retailer Sainsbury. The initial export trade lane runs from Felixstowe and transports containerized building tractors of JC Bemford to locations around the globe. By Month 24, there are other trade lanes and data pipelines in operation (See T10.2). Deliverable D10.13 and D10.23 is the final report on Work Package 10, Phase One developments of the Sainsbury, JCB and Other demonstrators:

Summary of Progress to Month 24

We have described the problems identified in the supply chain and outlined our vision and aspiration to achieve a future situation based on integration of IT systems, a better and more accurate data flow and the impact this supply chain visibility would have on commercial and regulatory procedures. We have described the structure and plan for the WP10 demonstrator based on the current situation and the proposed situation. We have designed the data pipeline configuration for our selected trade lanes.

We have developed several demonstrator solutions and piloted the integration of four data pipelines with two 'backbone hubs'; these are the One Government at the Border data repository and the Destin8 Port Community System of Maritime Cargo Processing.

By the end of Month 24, April 2016, CORE Work Package 10 has completed Phase One of the developments of the Sainsbury, JCB and other demonstrators (D10.13 and D10.23). The Work Package 10 Demonstrator has provided data in new XML schemas to the One Government at the Border pilot data repository and evaluated that work under Work Package 2. In CORE Task 6.1, HMRC continues to contribute to Sub Task 6.1.2 to align tools and certification in order to create the XML data carrier structure, derived from the UN/CEFACT Core Component Library, to take data from private sector systems and send the data to public sector systems. Governance and security of the data is being established but not under an overall Public-Private Governance Model (PPGM).

We have the first results of the demonstrator in the Phase One pilot using the four data pipelines feeding into the One Government at the Border data repository. The data bridge between Destin8 and Port Health at Felixstowe is under way. We have finalised the initial data model (the UCC data model is not yet agreed), finalised the Waypoints and XML schemas and the Message Implementation Guide.

We are ready to commence Phase Two starting in May 2016 and ending in April 2018.

Ambition

The ambition for Work Package 10, in-line with the strategic goals of the CORE Project, is to research, develop and demonstrate a collaborative Global Supply Chain Visibility Tool that interacts with government authorities and other Supply Chain stakeholders to improve commercial and regulatory supply chain security and management. Supply chain visibility helps buyers, sellers and logistics providers to reduce their risks and better manage transactions, overheads and margins. Supply chain visibility also helps regulatory authorities to identify compliance, improve targeting and risk management capability and to also improve public, private partnerships.

We have defined use cases within the Work Package 10 that are designed to showcase the capabilities of such a solution and validate it so that it successfully resolves the key challenges that have been identified above and within the CORE Description of Work (DoW). The task of Work Package 10 is to implement this collaborative Global Supply Chain Visibility tool, as described in the Description of Work. To that end, the CORE Work Package 10 Demonstrator concerns improving data quality and supply chain visibility in selected trade lanes initially through the UK Port of Felixstowe.

Goal

Within Work Package 10, the global supply chain visibility tool is the seamless, integrated data pipeline. The WP10 goal is to develop and demonstrate four data pipelines, integrate them with two UK data hubs and at least one hub outside the UK, deliver commercial supply chain visibility as a consequence of these data pipelines in an import and an export scenario and demonstrate that the resultant data sharing and supply chain visibility improves regulatory supervision.

Expected Results

CORE Work Package 10 will demonstrate the following results in order to achieve the above ambition and goal:

1. Successful development and operations of each of the (four) pipelines;
2. Pipelines capturing the right data at the right time;
3. Commercial viability and attractiveness of the pipelines to customers;
4. A new data model based on regulatory requirements and built to international standards;
5. Four new waypoints within a supply chain from which to send the required data;
6. A data carrier structure to international standards (XML message);
7. A Message Implementation Guide to identify and clarify any anomalies between the UN Core Component Library and commercial terminology;
8. Pipelines sending the right data using XML messages from the waypoints at the right time to the One Government at the Border data hub;
9. Pipelines sending the right data using XML messages from the waypoints at the right time to the UK port community system, Destin8 data hub;
10. Pipelines sending the right data using XML messages from the waypoints at the right time to the Australia Border Force data hub;
11. Destin8 sending the right data at the right time to the participating UK border agencies;

12. Improved regulatory supervision as a consequence of data sharing and supply chain visibility from data pipelines.

Short description of scope of the demonstrator

The key tool and the concept we are researching and proving is the web-based seamless integrated data pipeline. The virtual pipeline is actually a combination of an operating system or backbone and a series of commercial and logistics milestones such as purchase order receipt, consignment completion, container loaded onto vessel and vessel sailed, container arrival and container deconsolidation. Each milestone has its own data requirement, timeline, activity and responsible person.

Summary of Set-up phase (M0 to M18)

We started CORE Work Package 10 activities in May 2014 in the Planning Stage. The first phase was to establish and develop the understanding of the pipeline operating systems within current supply chain management procedures. Currently, they serve their existing commercial customers very well and on a sustainable basis. But WP10 is continually testing, additionally, the ability of the systems/pipelines to provide accurate, early data to a range of regulatory authorities in both the import and export countries. This confronts current practices which are proving very difficult to change. The second phase was to create a 'maximum regulatory' data model and a data carrier structure, to international standards, to take data from the pipelines to a range of border agencies through data hubs. These data hubs are sometimes called single windows although we do not use that term in Work Package 10. We carried out extensive research into data models and standards which involved all the WP10 participants in their various roles. The pipelines provide voluntary, non-declaration data with no legal status.

From May 2014 to October 2015, CORE Work Package 10 completed the Set-up of the Sainsbury's, JCB and other demonstrators. We produced an intermediate report at Month 12 (D10.11 and D10.21) and a further report at Month 18 (D10.12 and D10.22).

We have analysed and described the current situation of the supply chain. We explained the commercial relationship between buyers and sellers and the roles and activities of transport and logistics players in between such as Freight Forwarders, Terminal Operators, Carriers and the border agencies such as Customs. We analysed and described the physical flow of goods between seller and buyer and the logistical activities in between. (See Figure 2-3 below) We studied and clarified information flows and articulated the requirements of organisations involved in CORE Work Package 10.

We analysed, developed and described the processes, parties and roles, how we were exchanging information from business to pipelines and how the pipelines would provide visibility solutions for business and border agencies. We concentrated much more on demonstrating these visibility solutions and data flows rather than how the data would be used by the border agencies for risk assessment, policy measures or supervision.

Current status of the demonstrator in the Living Lab methodology

This is the Final Report on Phase 1 that commenced in May 2014. We are ready to commence Phase 2 starting in May 2016 and ending in April 2018.

By the end of Month 24, April 2016, CORE Work Package 10 has completed Phase 1 of the developments of the Sainsbury, JCB and other demonstrators (D10.13 and D10.23).

We have completed the planning, set-up, system analysis, design of the LL and the implementation plan. From month 18 to month 24 we moved to the real life implementation or “Do” including preparation and execution of the LL and data gathering for the evaluation where concrete WP10 Living Lab solutions were prepared for execution and implemented in a real life environment.

In this six month period the Work Package 10 Demonstrator has provided data in new ‘draft’ XML schemas (a shortened version of Waypoint One) to the One Government at the Border pilot data repository and evaluated that work under Work Package 2 based on KPI measurements and on feedback from the users. We have the first results of the demonstrator in the Phase 1 pilot using the four data pipelines feeding into the One Government at the Border data repository. An additional data bridge between Destin8 and Port Health at Felixstowe is under way.

In CORE Task 6.1, HMRC continues to contribute to Sub Task 6.1.2 to align tools and certification in order to create the XML data carrier structure, derived from the UN/CEFACT Core Component Library to take data from private sector systems and send the data to public sector systems. Governance and security of the data is being established but not under an overall Public-Private Governance Model (PPGM).

We evaluated the process of data transfer, the ability of the One Government at the Border data repository to receive data and make that data visible to users and we acted on the results of that evaluation.

Phase 2 will be a new cycle entry and roll out of the solution where lessons learned from the evaluation phase about the Waypoints, message structures and Message Implementation Guide will lead to the decision about how to continue and the shape of the new cycle.

When the technology and the solution is sufficiently mature, further rolling out or commercialization will be arranged outside of the Living Lab. We are already consulting other commercial users.

In the six months from November 2015 to April 2016 we have finalised the initial data model (the UCC data model is not yet agreed), finalised the Waypoints and XML schemas and finalised the Message Implementation Guide.

The Felixstowe stakeholder committee (Task 10.6) will guide the demonstrator activities and expected outcomes, ensuring that key outputs are achieved and evaluated. This committee will be formed in Phase Two when data is available from the pipelines and is sent to the border agencies. However, the involvement of CORE WP10 in the One Government at the Border Programme and the inclusion of other countries such as Australia will, in effect, provide the stakeholder management role anticipated by Task 10.6.

Actions performed since last report

Since October 2015, based on the evaluation process from the One Government at the Border pilot, we have finalised an end-to-end regulatory data model that describes the data we will be sending from the pipelines to the regulatory authorities. This has been based on the European Union Customs data requirement for import, export and safety and security declarations and applied to the UN/CEFACT Core Component Library to produce a UML diagram. We have influenced the WCO and EU Customs Data Models and ensured strategic alignment and compatibility under Work Package 6. These WP10 data models conform to WCO, UN/CEFACT, European Commission and major industry standards. (ST6.1.3b)

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We have evaluated the Waypoints and their data schemas and the availability and transference of the required data from the pipelines to OG@B and Destin8. (ST10.1.3 and ST10.2.3 and others)

Conex has been working closely with GEFEG https://www.gefeg.com/en/gefeg/gefeg.htm using the GEFEG.FX software to model data formats and develop the Message Implementation Guide. GEFEG.FX is the only software tool that brings together modelling, XML schema development and editing of classic EDI standards under a unified user interface and that supports the development of multilingual implementation guidelines. Conex has also helped bring the WP10 data model and schemas into UN/CEFACT with a view to being adopted in the future as an international standard.

Metro Shipping, Warrant Group and Uniserve have been using their Freight Forwarding experience to modify and improve the XML schemas and the Message Implementation Guide to ensure it reflects the practical translation of terms from the UN Core Component Library to those used within commerce and the freight forwarding industry. New buyer and seller customers are also being identified to participate in further roll out or commercialization outside of the Living Lab.

BAP Port Centric and Descartes continue to work with Sainsbury's to finalise their data security issues and continue with the development of the Descartes data pipeline.

Although data has been transferred from the pipelines to One Government at the Border and to Destin8 it has not yet been transferred to the regulatory authorities. This is a critical milestone yet to be achieved in Phase Two. Instead, the OG@B facility has given these participating agencies access to a limited data set (OG@B Proof of Concept schema) on a read-only basis in order to evaluate the process and concept. HMRC continue to work alongside One Government at the Border to facilitate the modelling of a UK strategy for capturing and using commercial trade data. This includes the development of the HMRC Customs Declaration Services project (CHIEF Replacement) and the Border Force's, Automated Freight Targeting Capability (AFTC). In the meantime WP10 continues with its original aim of passing data from the pipelines through Port Community Systems and into border management agencies.
Further transformation activities are required to capture more data upstream in the pipelines and to support information exchange processes between pipelines and different supply chain stakeholders. (Milestone D6.31C)

Maritime Cargo Processing are negotiating and developing a 'data bridge' between Destin8 and the Felixstowe Port Health Authority. This will further demonstrate the concept of capturing pipeline data and sending selected data through a port community system and on to the border agencies. Supervision concepts operated by the border management agencies will only be changed when we can provide them with the data. (ST10.1.3 and ST10.2.3 and others)

HMRC have helped to describe the use and benefits of tools, certification and controls that support a System-Based Approach as a consequence of providing data from the pipelines. But this involves procedural, behavioural and systems changes within HMRC and many other border agencies. For Work Package 10, this has been considered as probably unrealisable but efforts continue. (ST6.1.2)

Since October 2015, we have been testing the data pipelines and their commercial dashboards and testing the data model, the carrier structure and the schemas. We have been developing the capture of data from the pipelines, the ability of Destin8 and OG@B to receive and display the data then forward the data on to the regulatory agencies and the regulatory agencies ability to receive it. These are a series of blended activities and processes with no real beginning or end. This is the 'agile' and cyclical approach adopted within WP10.

Decisions made since last report

We have learned that operational and management efficiency and overall understanding of the international supply chain varies considerably from company to company.

One significant challenge, for example, is to capture data such as Harmonised System codes, origin and other export declaration data at the Consignment Completion Point (Waypoint 1) and other transport data throughout the supply chain (Waypoints 2 to 4). Traditionally, this has been the domain of the export Customs agent and the export Freight Forwarder. This process of data capture requires role and systems change for pipeline providers and retailers (importers/consignees). Stretching the traditional freight forwarder role further upstream in the supply chain has been challenging in the first two years of WP10. The challenge may continue for some time depending on the commitment of the pipeline providers and retailers to change long standing roles, practices, systems and procedures.

The accurate, cost efficient and timely provision of data from CORE WP10 data pipelines has been shown to increase the much needed supply chain visibility and reduce costs. (See 4.1 Qualitative descriptions of the demonstrator results).

The CORE WP10 ambition will address these lessons learned by creating a closer alignment of institutional capabilities with operational requirements. Better, more timely data will minimise transaction costs of supply chain operators and delays at borders due to freight screening and physical inspections.

By providing the data and visibility, CORE WP10 will assist freight forwarders to manage security and the supply chain, improve co-operation between different groups of stakeholders and provide effective information sharing.

We have learned that the UNeDocs project and the UN/CEFACT International Supply Chain Reference Model (ISCRM) realistically and practically reflect the needs of international trade and can be used effectively to create a new data model to service supply chain visibility and regulatory requirements.

In addition to the challenges of changing commercial systems we have also learned that changing long established process, procedures and practices across government is difficult to achieve. The importer is not the person who is responsible for loading a sea container or sending goods into the supply chain. Often the importer does not know what will arrive as a consequence of his order until he sees what is being unloaded from the container. So how can the authorities hold the importer legally responsible for something he has no control over? The long established practice of making an import declaration about goods the importer has never seen and did not pack is outdated and with little foundation in a modern world. Despite the lack of international law covering the end-to-end activities of an international supply chain, CORE WP10 has demonstrated the value of holding the shipper accountable for the goods being sent and the power of the buyer in insisting this happens.

Nevertheless, Customs are reluctant to replace the outdated declaration with real time data relating to the same goods. Customs and other border management agencies are, however, keen to receive the same data, from a more reliable source and earlier than they do now to allow for pre-arrival, pre-departure risk analysis, as per the WCO Framework of Standards. But they cannot bring themselves to use that same data for revenue and compliance purposes instead of a legally flawed declaration.

Since the piloting of CORE WP10 data with One Government at the Border, it has become increasingly uncertain that the 20 or so UK border management agencies have the appetite or where-with-all to change their existing systems and procedures in favour of more accurate, earlier data from the right source. The execution, therefore, of the data pipelines will continue within CORE WP10 in order to

demonstrate its potential and clear commercial value, but the future of sending this data to where it is most needed within border agencies is uncertain.

The original solution anticipated at the start of CORE WP10 was for a seamless data flow from the pipelines to the customer / buyer and also to a range of border management agencies. The seamless flow into or adjacent to company's ERP systems has been achieved, accompanied by powerful and meaningful dashboards. But border agencies are not able to cope with this seamless, sustainable data flow from millions of commercial import and export transactions. So CORE WP10 adjusted the solution into a more manageable process consisting of the four Waypoints described in Section 2.4. This, in turn, required a data model and XML schemas that are also developed and pioneered within CORE WP10.

Conclusions and next steps

1.1 Conclusions

Subject	Successes	Barrier
solutions tested in LL	• Built seamless, secure, credible, managed integrated data and logistics pipelines. • Incorporated interoperability standards that will eventually become the normal way of doing business. • Finalised an end to end regulatory data model. • Finalised message exchange schemas. • Piloted the integration of data pipelines with port community systems and border agencies. • We have sent XML data files from pipelines to Destin8 and the OG@B data repository. • We have evaluated the Waypoints and their data schemas and the availability and transference of the required data from the pipelines to OG@B and Destin8.	• Data has not yet been transferred to the regulatory authorities. This is a critical milestone yet to be achieved in Phase Two. Instead, the OG@B facility has given these participating agencies access to a limited data set (OG@B Proof of Concept schema) on a read-only basis in order to evaluate the process and concept. • Further transformation activities are required to capture more data upstream in the pipelines and to support information exchange processes between pipelines and different supply chain stakeholders. • Procedural, behavioural and systems change within HMRC and many other border agencies.

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Subject	Successes	Barrier
LL Process	• Adopted European Union Customs data requirement for import, export and safety and security declarations and applied it to the UN/CEFACT Core Component Library to produce a UML diagram. • Influenced the WCO and EU Customs Data Models and ensured strategic alignment and compatibility under Work Package 6. • Ensured WP10 data models conform to WCO, UN/CEFACT, European Commission and major industry standards. (ST6.1.3b) • Transformed activities to capture more data upstream in the pipelines and to support information exchange processes between pipelines and different supply chain stakeholders. • Maritime Cargo Processing are negotiating and developing a 'data bridge' between Destin8 and the Felixstowe Port Health Authority. • HMRC have helped to describe the use and benefits of tools, certification and controls that support a System Based Approach as a consequence of providing data from the pipelines. • Testing the data pipelines and their commercial dashboards and testing the data model, the carrier structure and the schemas. • Developing the capture of data from the pipelines, the ability of Destin8 and OG@B to receive and display the data then forward the data on to the regulatory agencies and the regulatory agencies ability to receive it. Final user involvement in all phases of IT tool development and execution.	• Operational and management efficiency and overall understanding of the international supply chain varies considerably from company to company. • Capturing data such as Harmonised System codes, origin and other export declaration data at the Consignment Completion Point (Waypoint 1) and other transport data throughout the supply chain (Waypoints 2 to 4). Traditionally this has been the domain of the export Customs agent and the export Freight Forwarder. • Data capture requires role and systems change for pipeline providers and retailers (importers/consignees). • Stretching the traditional freight forwarder role further upstream in the supply chain has been challenging in the first two years of WP10. • The challenge may continue for some time depending on the commitment of the pipeline providers and retailers to change long standing roles, practices, systems and procedures.

Table 5-1 Summarizing table of successes and barriers for the Living Lab

Work Package 10 has supported the objectives of WP2 by using the UN/CEFACT Core Component Library to adopt a classification of terms (taxonomy). We have undertaken innovative developments such as data pipelines, Waypoints and new messaging aligned to the WP 10 Demonstrator.

Work Package 10 has assisted the Technical University of Delft in Work Package 6 with the development of a Public-Private Governance Model (PPGM) to provide a means to analyse, explain and design the governance of the data-sharing innovation in WP10 and to make it acceptable to all parties that are needed to make it work. We have used the Public-Private relationship of Maritime Cargo Processing with a range of UK government departments and the use of their Destin8, Port Community System in the process of sharing commercial data with regulatory border agencies.

We have analysed processes, data, supply chain roles and systems and presented supply chain data in a unified structure (UML diagram). We have, then, created standard information messages using EU Customs legislation and the GEFEG tool to map against UN/CEFACT, the WCO and the European Commission standards and data models to ensure international compatibility. We have produced a new Object-Oriented Unified Data Structure or Data Model to facilitate the development of interoperable solutions for the WP10 Demonstrator.

Work Package 10 has supported the objectives of WP8 by progressing the integration of the data pipeline with two other data hubs of the UK; the One Government at the Border Programme and the commercially operated Destin8, Port Community System of MCP. Rather than wait for the CORE ecosystem to become available we continue to research and demonstrate an innovative solution in Work Package 10 that is delivered within a real-time, commercial and regulatory operational environment.

1.2 Next steps

The continuing ambition for Work Package 10 is to research, develop and demonstrate a collaborative Global Supply Chain Visibility Tool that interacts with government authorities and other Supply Chain stakeholders to improve commercial and regulatory supply chain security and management.

In the first 24 months, we have delivered pipelines but they are yet to be fully collaborative and do not yet interact with government authorities. Whilst we can demonstrate commercial efficiencies we cannot yet improve regulatory supply chain security and management.

In Phase 1 of CORE, the first 24 months, we have researched, developed and demonstrated four data pipelines as supply chain visibility tools. We have showed that we can provide data of improved quality and supply chain visibility to a UK Government data hub (One Government at the Border) and to a commercial data hub (the Destin8 Port Community System). We have captured and provided import and export data. We have concentrated on making the pipelines commercially attractive and on developing the data carrier structure from pipelines to the data hubs to strict international standards to ensure future global acceptance and compatibility.

We are, however, confronting well-established commercial and Government practices, procedures, systems, culture, attitudes and behaviours. Since the start of the CORE Project in May 2014 the *One Government at the Border Programme* has commenced in the United Kingdom and introduced a Government data hub alongside the port community systems, such as Destin8 and CNS. As a consequence the flow of data from the pipelines to the participating border agencies has been interrupted pending the preferred strategy to be adopted by UK Government. For example, will the OG@B data hub run in parallel to the port community systems or in competition to them? Will the UK Home Office, Border Force's, Automated Freight Targeting Capability (AFTC) adopt the targeting requirement and function of all UK border agencies? Will all the border agencies have to follow the strategy adopted by OG@B?

The OG@B Programme is clearly needed and is a valuable initiative in leading the United Kingdom towards more efficient border management processes. It has recognised and launched CORE Work Package 10 into the much welcomed political and operational spotlight and provided us the opportunity to demonstrate this adventurous and challenging concept. But it has also created a high degree of uncertainty across the border agencies. In Phase Two CORE Work Package 10 will work together with OG@B to clarify the uncertainty and demonstrate the value of pipeline data.

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In order to continue to meet our CORE Work Package 10 ambition and goals, in Phase Two we will produce the following results:

- Destin8 will build a data bridge with Suffolk Port Health and we will provide them with the data from the pipelines;
- We will achieve further transformation activities to capture more data upstream in the pipelines and to support information exchange processes between pipelines and different supply chain stakeholders. Traditionally this has been the domain of the export Customs;
- We will continue with our dissemination and education activities such as presentations to government and commercial bodies in order to improve overall understanding of the international supply chain and the value of supply chain visibility;
- We will contunue to challenge and stretch the traditional freight forwarder role further upstream in the supply chain;
- We will provide better quality data from a better source than now in order to influence procedural, behavioural and systems change within many border agencies;
- Pipelines will send the right data using XML messages from the waypoints at the right time to the One Government at the Border data hub;
- Pipelines will send the right data using XML messages from the waypoints at the right time to the UK port community system, Destin8 data hub;
- Pipelines will send the right data using XML messages from the waypoints at the right time to the Australia Border Force data hub and other participating border agencies;
- Destin8 will send the right data at the right time to the participating UK border agencies.

In Phase 2, from May 2016, we will be concentrating on sending higher quality and a greater quantity of data in a sustainable stream from the pipelines to the second One Government at the Border data repository and the Destin8 Port Community System. The new UK Customs Declaration Services may also be able to receive CORE WP10. Data from JCB under T10.2 will be sent from the Metro Shipping pipeline, MVT, to Australia Border Force. Other UK pipeline providers will establish trade lanes and pipelines also with Australia and with other countries such as Canada.

In Phase 2, we will attempt to improve regulatory supervision as a consequence of data sharing and supply chain visibility from data pipelines but we are not in control of this ambition. We will continue to work with the European Commission and the World Customs Organisation to influence their Customs data models and support the drive for improved supply chain management. We will continue to work alongside the United Nations Economic Commission for Europe and UN/CEFACT to create a multi modal and commercial cross border data model.