TECHNICAL SPECIFICATION

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Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Governance rules to sustain electronic information exchange methods

Systèmes intelligents de transport — Échange d'informations électroniques pour faciliter le mouvement du fret et son transfert intermodal — Règles de gouvernance pour soutenir les méthodes d'échange d'informations électroniques

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

Introduction

Electronic commerce offers new opportunities to improve the efficiency of business operations and to reduce costs associated with trade procedures, providing increased competitive advantages to the commercial actors ready to embrace new methods of work and trade. Emerging electronic commerce platforms and the use of the Internet provide users with a combination of technologies to communicate data, to contract electronically, as well as to manage new business processes leading to new business models.

Improved information sharing among supply chain partners is one of the key business objectives which enable the participants to improve their operational efficiency and optimize their enterprise resource allocations. Due to the existence of heterogeneous IT environments among supply chain partners, it is a challenge for the implementer to seamlessly integrate information from multiple data sources and in different data formats. Each data source is typically designed for a single, stand-alone purpose within an enterprise, not to be part of an integrated data collection. Thus, these disparate data repositories tend to be silos, independent of one another, and not working well together. Business entities wishing to engage with other business partners to facilitate certain standards of practice for information interchange will need to abide by certain rules, otherwise the efficiencies sought using the methodologies in this Technical Specification will be diminished.

Within this context, and within this Technical Specification, "governance" is defined as "rules, processes, and behaviour that affect the way in which powers are exercised…particularly as regards openness, participation, accountability, effectiveness, and coherence". As discussed in 5.2.5 of ISO/TS 24533, there needs to be a governance process to tie loose ends together and allow the supply chain partners to keep their data exchange standards viable and effective. Governance is key to this process of maintaining the structures that allow for a high degree of supply chain productivity and for holding together the community partnerships that make such an arrangement economically advantageous. A governance specification is critical to making the process described herein effective. There is an expectation that a Technical Specification on governance will provide the guidance that will keep the supply chain standards viable and useful for the community of users wishing to maximize their returns on investment.

Rules of governance are intended to maintain standards harmony and to be approved through international consensus by the International Standards Organization (ISO TC204) as umbrella guidance for the members who will adopt the methodologies of this Technical Specification and keep the necessary standards relevant to their purpose.

A governance model that is elevated to an International Technical Specification means those investing in the implementation of the methodologies and standards activities have some assurance of continuity, thereby promoting greater adoption and further leveraging investments, and use of the standards. The vision expressed by this Technical Specification is to allow trading business partners to operate in a seamless manner to get goods to the marketplace meeting the highest level of performance standards.

Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Governance rules to sustain electronic information exchange methods

1 Scope

This Technical Specification provides governance rules to be used for executing an organized process for business entities to connect to one another electronically for the conduct of electronic trade in a secure and open environment through a standardized framework for information exchange. This standardized framework includes the processes and process tools that will ease connections between trading partners, provide full visibility, and reduce the time goods spend in transit. Additionally, the application of these rules and attendant standards and technology applications are expected to allow business entities to engage their legacy systems without the cost of upgrades.

The processes and process tools include web services technologies to improve the operating efficiency, safety, and security of freight movement. These technologies are used for sharing information between supply chain partners in a commonly understood manner by capturing it only once and sharing it many times, and giving all partners the same view of the data.

A service-oriented architecture leverages the web services functionality and necessitates the requirement for data exchange standards. These tools hinge on the successful definition and adoption of data standards published in open and accessible forums. The advantages of using information technology tools are undeniable and their use is now widespread across industry. The freight transport and logistics industry is no exception with all businesses using e-business to some extent.

This Technical Specification does not address liability of any kind as this is considered within the domain of each participating party.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 24533, *Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 24533:2012 and the following apply.

3.1
bill of lading
document which evidences a contract of the carriage and the taking over or loading of the goods by the carrier, and by which the carrier undertakes to deliver the goods against surrender of the document

[SOURCE: ISO/TS 24533:2012]

Note 1 to entry: A provision in the document that the goods are to be delivered to the order of a named person, or to order, or to bearer, constitutes such an undertaking. The document has the following functions:

1) a receipt for goods, signed by a duly authorized person on behalf of the carriers;

2) a document of title to the goods described therein;

3) an evidence of the terms and conditions of carriage agreed upon between the two parties.

3.2
carrier
person or organization, who owns and/or operates a transport means, engaged in the transportation of passengers or property by land, rail, air, or water

[SOURCE: ISO/TS 24533:2012]

3.3
consignee
receiver
person or company to whom goods are shipped

[SOURCE: ISO/TS 24533:2012]

3.4
consignor
shipper
party which, by contract with a carrier, consigns or sends goods with the carrier, or has them conveyed by him

[SOURCE: ISO/TS 24533:2012]

3.5
customs broker
party who is licensed to enter and clear goods through customs

Note 1 to entry: The responsibilities of a broker include preparing the entry form and filing it; advising the importer on duties to be paid; advancing duties and other costs; and arranging for delivery to the importer.

3.6
forwarding instructions
document issued to a forwarder, giving instructions regarding the action to be taken for the forwarding of goods described therein

Note 1 to entry: Forwarding instructions are used by any party who gives instructions for the transportation services required for a consignment of goods to any party who is contracted to provide the transportation services. The parties who issue this document are commonly referred to as the shipper or consignor, while the parties who receive this document are forwarders, carriers and shipping agents. This document can also be issued by a forwarder or shipping agent in its capacity as a shipper. This document can be used to arrange for the transportation (1) of different types of goods or cargoes; (2) whether containerized or non-containerized; (3) through different modes of transport including multi-modal; and (4) from any origin to any destination.

3.7
freight forwarder
party arranging the carriage of goods including connected services and/or associated formalities on behalf of a consignor or consignee

[SOURCE: ISO/TS 24533:2012]

3.8
Freight-X
Freight information-eXchange
consolidated global exchange of freight information

Note 1 to entry: Some examples include the “Electronic Freight Management” (EFM) program in the US as well as the “eFreight” program and its affiliates in Europe.

3.9
Freight-X communities
Freight-X participants
Freight-X user communities
communities of organizations who have formally agreed to collaborate to operate using the principles defined in this Technical Specification by joining a Freight-X consortium

3.10
Freight-X community provider
organization who implement mechanisms for managing demand and supply of available Freight-X services supporting freight transportation management operations

3.11
Freight-X consortium
organizations who have formally agreed to form a formal association which has established rules and governance procedures to collaborate to operate using the principles defined in this Technical Specification

3.12
Freight-X community provider agreement
formal agreement by Freight-X community provider in respect of representation rights, access to specifications and services, data and document provision, specification, management, and access and maintenance

3.13
Freight-X governance
Freight-X governing body
system through which national and international freight communities' demand for and supply of electronic business services to support freight operations is directed and controlled

3.14
Freight-X message profile
specification of how one or more Freight-X business processes are executed by specifying the Freight-X business rules governing its business collaborations and the information content (message profile) of the electronic business transactions exchanged

3.15
Freight-X service
web service created specifically to address business processes related to electronic freight management

Note 1 to entry: Examples include receive order, confirm booking, and obtain status.

3.16
Freight-X specifications
explicit set of requirements to be satisfied by Freight-X

3.17
friends of the shipment
collection of parties whose role in a particular shipment has been established and documented in the Freight-X registry enabling access to the shipment information

3.18
level of service
measure to determine the effectiveness of elements of the Freight-X transportation infrastructure

3.19
logistic service provider
party providing logistic services such as warehousing, repacking products, distribution, and assembly (i.e. third party logistic provider, container freight station)

3.20
message profile
content of the electronic business transactions exchanged described with an aim to function as part of a formal agreement

3.21
packing list
document stating the distribution of goods in individual packages, such as shipping document issued by shipper to carrier, customs and consignee serving the purposes of identifying detail information of package count, products count, measurement of each package, and weight of each package

3.22
small and medium-size enterprise
any entity engaged in an economic activity, irrespective of its legal form, that is characterized by number of employees, annual turnover, and/or annual balance sheet which falls below established limits

Note 1 to entry: Within European Union, fewer than 250 persons, annual turnover not exceeding 50 million euros and annual balance not exceeding 43 million euros. (Commission recommendation of 6 May 2003 concerning the definition of micro, small, and medium-sized enterprise.) Reference: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:EN:PDF

3.23
terminal operator
party with operational responsibilities at origin or destination nodes for freight transport journeys (i.e. overseeing the unloading of goods, checking the quantity of goods against the manifest, transferring of the goods, checking documents, authorizing a carrier to pick up goods)

3.24
transport service buyer
party who gives instructions for the transportation services required for a consignment of goods

3.25
transport service provider
party who is contracted to provide the transportation services (i.e. freight forwarder)

3.26
transport status document
document issued on individual specific request or through an agreed status reporting procedure by a freight forwarder (also known as the transport service provider) to communicate to the consignee or consignor (also known as the transport service buyer) or notify party the status of shipments that are currently under the freight forwarder's management

3.27
waybill
document issued by the party who provides the physical transportation services to the party who gives instructions for the transportation services (i.e. shipper, consignor)

Note 1 to entry: A waybill states the details of the transportation, charges, and terms and conditions under which the transportation service is provided. Unlike a bill of lading, a waybill is not negotiable and cannot be assigned to a third party transport document describing a shipment. It is issued by the party who undertakes to provide transportation services or undertakes to arrange for their provision to the party who gives instructions for the transportation services (i.e. shipper, consignor). It states the instructions for the beneficiary and can contain the details of the transportation, charges, and terms and conditions under which the transportation service is provided.

4 Symbols and abbreviated terms

ABIE	Aggregate business information entity
ACC	Aggregate core component

APEC	Asia Pacific Economic Cooperation
ASBIE	Association business information entity
ASCC	Association core component
BBIE	Basic business information entity
BCC	Basic core component
BIE	Business information entity
CCT	Core component type
CCTS	Core Components Technical Specification
CEN	European Committee for Standardization
ebXML	Electronic Business Extensible Markup Language
EDI	Electronic Data Interchange
EFM	Electronic Freight Management
ESB	Enterprise Service Bus
FOS	Friends of the Shipment
ICT	Information and Computer Technologies
IMOD-PRO	Intermodal Freight Process
INAT-PRO	International Freight Process
INCOTERMS	International Commercial Terms
ITS	Intelligent Transport Systems
MIME	Multipurpose Internet Mail Extensions
Neal-Net	Northeast Asia Logistics Information Service Network
OASIS	Organization for the Advancement of Structured Information Standards
OASIS UBL TC	Organization for the Advancement of Structured Information Standards – Universal Business Language Technical Committee
RAND	Reasonable and non-discriminatory (license)
RBAC	Role-based Access Control
SME	Small and Medium-sized Enterprise
SOA	Service Oriented Architecture
SOAP	Service Oriented Architecture Protocol
TDED	Trade Data Elements Directory
UBL	Universal Business Language
UDDI	Universal Description Discovery and Integration
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business

UNECE	United Nations Economic Commission for Europe
WSDL	Web Service Description Language
XML	Extensible Markup Language
XSD	XML Schema Definition (language)

5 Freight-X governance

5.1 General

Governance of FREIGHT-X is defined as the system through which the national and international freight communities' demand for and supply of electronic business services to support freight operations (referred to as Freight-X) is directed and controlled.

Governance involves directing and evaluating the implementation and operations of Freight-X communities among collaborating organizations and monitoring its employment to achieve planned business objectives. It includes the strategy and policies for using Freight-X among those collaborating communities. For example, governance controls would ensure that changes to Freight-X Profiles are minimal, reached by consensus, and driven by strong business needs.

5.2 Strategic governance requirements

Strategic governance requirements include the following:

— a standardized governance model for all Freight-X implementations based on collaborative levels of responsibilities;

— a recommended implementation process within a community of users, identifying the relationships between all parties to the governance model and the cooperation needed between them to realize the full benefits of adoption. Full benefits will be realized when Freight-X best practices are adopted by all supply chain partners. It is critical that partners serving multiple shippers, like forwarders and brokers and logistics firms adopt Freight-X and perpetuate it with partners in other supply chains to further spread the benefits;

— each Freight-X community to adopt Freight-X profiles (and related standards) that not only promote integration with other services but also capture "data coherence" and "semantic consistency" of the information between these services. A Freight-X profile should:

  — identify core set of information bundles,

  — identify "how" you communicate the information bundles to your partners,

  — include generic rules and procedures for refining a tool for use within your organization, and

  — can include code lists and message schemas;

— to keep the Freight-X standards in a form that will not be altered without the user community's consent. This will also ensure the proper operation and utilization of the standard set of messages for all future adopters;

— a standards-based coherence model that can also be used to pre-qualify incoming participants and set required levels of engagement as dictated by the governance model;

— the Freight-X governance model can be promoted as an international trade facilitation framework standard (similar to initiatives such as "single window", which is the implementation of a single window system that enables international (cross-border) traders to submit regulatory documents at a single location and/or single entity).

5.3 Management

This open community model covers the policies, systems, and procedures laid down to guide the development and operations of Freight-X communities.

5.4 Ownership

Freight-X shall, to the extent possible, be implemented using an open-source solution and shall not rely on any third-party, proprietary solution that requires purchase of software licenses by the deploying party.

5.5 Central services/registry

For the Freight-X communities to interoperate, a single master registry identifying the various Freight-X communities in operation is essential and shall be given strong consideration by the governing body.

This central service could also be expanded to include publication of specifications, code lists, and other supporting materials.

The registry is vital to the establishment of the Freight-X governance model. Members of the Freight-X consortium shall post their available web services and necessary instructions on the registry for viewing to all other participants of Freight-X. Participants shall be able to view the services available and from which company, then proceed to download the necessary services to begin electronically communicating with the other participants/trading partners.

5.6 Intellectual property rights

The intellectual property of the Freight-X solution shall be offered on a nonexclusive, worldwide, non-sub licensable, perpetual patent license on fair, reasonable, and non-discriminatory terms without payment of royalties or fees to make, have made, use, market, import, offer to sell, and sell, and to otherwise directly or indirectly distribute licensed products that implement the Freight-X specifications. These are the terms for open standards and would be most likely to encourage wider adoption.

5.7 Information security

Only authorized parties involved in the consignment can access certain shipment records. The rules as to who can access the data and what data they can access, is determined by the shipment owner on a permission basis. The term, "Friends of the Shipment" (FOS) was coined in a United States electronic freight demonstration test that took place with Limited Brands Inc. Under this rule, a partner will not be privy to information that they do not have a need to know or that is business sensitive or might be used against a competitor.

6 Policy

6.1 General

The policy for operating under these rules in this Technical Specification is that all business entities wishing to engage with other business partners to facilitate electronic trade using the tools described herein shall follow certain standards of practice for information interchange and shall include the major recognized freight transport data standards, such as EDIFACT and GS1, but also include the OASIS-UBL transport data standards for information exchange based on the OASIS Universal Business Language (UBL). It shall not be required for all participating business entities to incorporate UBL standards into their core operation but if not totally adopted some manner of translation might need to be incorporated to allow the standards to operate as the common language between business entities.

NOTE These rules of governance are intended to be approved through international consensus by the International Standards Organization (ISO TC204) as initial guidance for the members who will ultimately form the governing body. These rules can be used between international partners, or purely between domestic partners, and are subject to change by the members that form the consortium.

The value of implementing a governance model is twofold; keeping the standard aligned to prevent runaway customization from happening (as it did with EDI), and to assist users to get full benefit out of Freight-X by promoting involvement among a larger group. It is expected that participation with users in one or two supply chains can reap benefits of 5 %–10 % but a community of users could realize benefits on the order of three or four times greater.

6.2 Governance model

This model has been inspired by other initiatives, including ISO/IEC DTR 38502, Governance of IT – Framework and model, but reflects the uniqueness of the Freight-X approach to create an open community where interoperability is achieved through common specification and not point-to-point arrangements.

The guiding principle for the "Freight-X governance model" is that a variety of solutions to support supply chain communities exist, and will continue to exist, into the future. In addition, privately operated supply chain communities exist within and across borders. Freight-X does not replace these solutions; it complements them and aims to coordinate information exchange between different communities.

To satisfy these requirements, several potential governance models were considered. The recommended model is based on communities operating their own solutions and registering these with a common central service. As a result, the proposed governance model for the Freight-X approach is built around two levels of governance:

— Global coordination - providing governance over all common components, standards and registries of accredited Freight-X solutions; managed by the Freight-X consortium and shown in Figure 1.

— Community coordination - providing governance over the implementation and use of Freight-X services within a common community. These communities can be based around a single supply chain (e.g. DEMDACO), a logistics community (e.g. Freightgate), or a service provider (e.g. SAIC), depicted as Freight-X community providers in Figure 1.

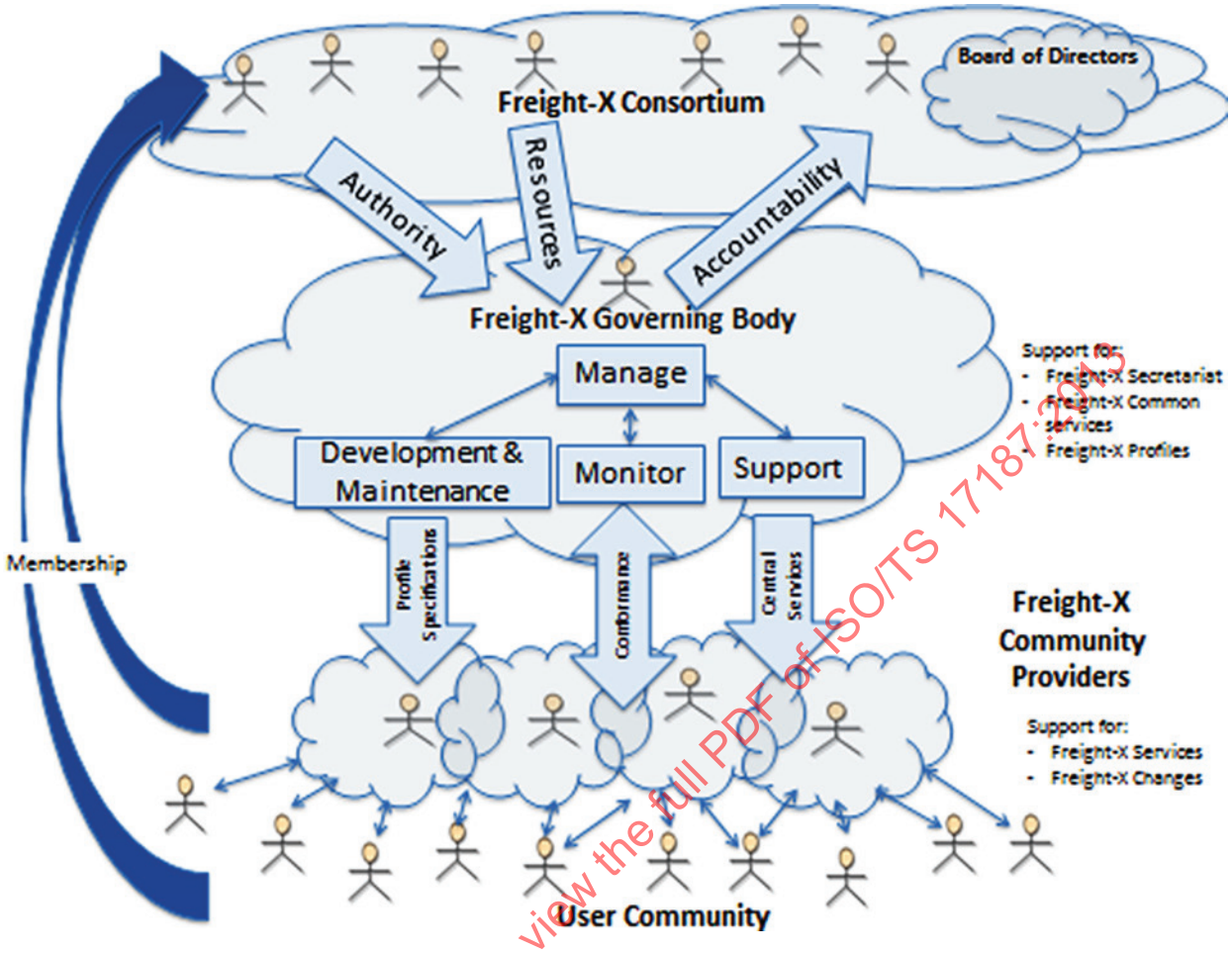

Figure 1 — Freight-X governance model (based on ISO framework)[1)]

To execute this model and the two levels of governance mentioned above involves the actions and interactions of four entities.

a) Freight-X consortium;

b) Freight-X governing body;

c) Freight-X community providers;

d) Freight-X user communities.

Figure 1 depicts the relationships among the various parties operating with the governance model. Below is an explanation of each group and their role.

6.3 Freight-X consortium

The Freight-X consortium is a non-profit legal entity that will own the Freight-X "brand". It shall have the authority to issue license agreements for Freight-X services that shall enable organizations to become Freight-X community providers. The composition of the Freight-X consortium shall include transportation stakeholders and other interested parties willing to share in the expenses of the organization.

Constitutionally, the "Freight-X consortium" shall be an "open community" based on the following policies:

— Membership criteria: Membership criteria should be no more restrictive than necessary to ensure an efficient process.

1) ISO/IEC DTR 38502 Governance of IT – Framework and Model

— Costs of participation: To the extent possible while still spreading costs fairly and accomplishing objectives, dues required to participate in all meaningful activities should be made acceptable to all classes of stakeholders and users.

— Member acceptance: All applicants that meet the established criteria should be automatically admitted in any category to which they choose to apply.

— Governance: The board or other governing body should not be controlled in the long term by the founders, although founding members will typically hold the initial seats. The board should also represent all classes of stakeholders, regardless of whether each class can afford a top-level membership.

— Technical participation: All members of eligible classes shall be entitled to participate equally in technical and other activities.

— Transparency: At a minimum, all standards shall be posted for public comment prior to adoption. Some consortia make all of the minutes and other proceedings of their working groups public from the beginning of a technical process.

— Adoption: All standards shall be available for implementation by non-members as well as members on a non-discriminatory basis.

NOTE Candidate Freight-X stakeholder organizations could include those involved in e-Freight, World Customs Organization (WCO), International Air Transport Association (IATA), International Federation of Freight Forwarders Association (FIATA), and regional freight forwarder associations.

The Freight-X consortium shall establish the "Freight-X governing body" as the accountable entity for ensuring that their interests, as well as those of the participating communities, obtain value from their investment in Freight-X while managing its risk. The agreed level of authority and boundaries on the scope of the "Freight-X governing body" shall be documented in the form of a charter or terms of reference.

6.4 Freight-X governing body

The "Freight-X governing body", with its supporting resources (secretariat) shall be an elected body responsible for achieving the overall objectives of the Freight-X, while taking into account in its decisions the legitimate expectations and interests of its consortium. It shall act to guide the adoption and use of Freight-X through policy making, strategy formulation, supervision of the Freight-X community providers, and accountability to the Freight-X consortium. The governing body shall address policy making and strategy topics such as

— consortium commitment to the Freight-X user communities,

— certification agreements for Freight-X community providers, including terms and conditions of registration and accreditation, and

— future requirements or new functionality for Freight-X:

  — adoption;

  — development and maintenance;

  — support.

Within the context of its operation, the "Freight-X governing body" functions shall include: development, support, and monitoring.

6.4.1 Development and maintenance

This function shall include the development and maintenance of the documents, specifications, and implementation guides. Typical categories of changes could include

— modifications to existing specifications,

— addition of new specifications,

— modifications to existing support data (e. g. business rules, code lists), and

— addition of new support data (e. g. business rules, code lists).

Development and maintenance tasks should be project-driven. Specific tasks shall be nominated through the Freight-X consortium with project teams appointed from its members.

6.4.2 Support

Support covers the secretariat functions, publication of documents, specifications and implementation guides for community providers. It also includes the provision of statements in respect to the strategies and policies affecting the data model, such as upgrades or new services. Services can include websites, registries, and repositories.

The recommendation is that one member of the consortium shall volunteer to function as the "secretariat," providing most (or all) administrative and other services, either without charge, or for payments derived from the fees of other members, as agreed by the majority of the members of the consortium.

6.4.3 Monitoring

Monitoring is the on-going reporting and assessment of the Freight-X service[2)] performance against expected outcomes as well as reporting of Freight-X communities' conformance with established criteria.

Regarding supervision of the Freight-X community providers, the "Freight-X governing body" shall address topics such as

— implementation package for communities,

— performance monitoring,

— conformance compliance, and

— ensuring that Freight-X community providers comply with the minimum requirements defined by a "community provider agreement".

6.5 Freight-X community providers

Freight-X community providers should be responsible for ensuring that the Freight-X consortium achieves required outcomes within the strategies and policies established by the "Freight-X governing body".

NOTE Examples of current Freight-X community providers are: Freightgate, and Kansas City Smartport, along with other Freight-X community providers in the European Community,

Within the proposed governance model, each accredited Freight-X community provider shall implement mechanisms for managing demand and supply of available Freight-X services supporting freight transportation management operations. This includes

— transforming their community's information exchange requirements into the Freight-X context,

— startup testing and validating of new participants entering the community, and

— monitoring on-going operations to ensure performance, quality, and security requirements are maintained.

2) A Freight-X service is a web service created specifically to address business processes related to electronic freight management. Examples include: receive order, confirm booking, and obtain status.

In addition, each accredited Freight-X community provider shall implement mechanisms for managing demand and supply of change initiatives to Freight-X services. Changes could include

— modifications to existing Freight-X services,

— addition of new Freight-X services,

— modifications to existing Freight-X profile schemas:

  — addition of new Freight-X profile schemas,

  — modifications to existing Freight-X support data (e.g. business process rules, code lists), and

  — addition of new Freight-X support data.

Finally, each accredited Freight-X community provider shall monitor and assess the performance and conformance of the on-going operations and report to the "Freight-X governing body" on an established schedule basis.

6.5.1 Freight-X community provider agreements

The Freight-X solution requires that a number of parties work together in a trusted environment based on common specifications and standards. The development and maintenance, as well as the implementation and use, of these common specifications and standards need to be governed across the full Information and Communication Technologies (ICT) infrastructure. In order to clearly regulate the roles and responsibilities of each party in the Freight-X solution, a set of agreements should be established.

A Freight-X "community provider agreement" shall be enacted between individual Freight-X community providers and the "Freight-X governing body" for the purpose of defining the terms and conditions under which the parties shall provide governance for the different levels of the Freight-X service.

The intent of this agreement, as with the overall governance model, is to ensure that the role and responsibilities of each party are clearly described and openly available, thus making Freight-X an open and transparent community.

The Freight-X "community provider agreement" shall be based on

— global coordination over all common components of the Freight-X solution,

— local coordination and supervision of the implementation and use of the Freight-X services operating within a community, and

— open and transparent provision of services based on a common set of agreements as well as common definition of services and service levels.

The main aspects regulated in this agreement shall include the following:

— that the Freight-X community provider is given the authority to represent Freight-X within its domain/community of interest of responsibility;

— that the Freight-X community provider is responsible for ensuring adequate performance by the Freight-X services established within its domain/community of interest, including their compliance to the Freight-X specifications;

— that the Freight-X community provider is guaranteed access to the Freight-X specifications in a timely manner;

— that the Freight-X community provider is responsible for maintaining the data about its registered Freight-X users in a timely manner;

— that Freight-X users are guaranteed open access to the Freight-X services according to specification in a timely manner;

— that all other Freight-X community providers are guaranteed open access to the community providers Freight-X services in order to deliver business documents to the Freight-X users according to specifications;

— that the Freight-X community provider guarantees to deliver any business document received from another Freight-X community provider to the stated receiving Freight-X user in a timely manner;

— that the Freight-X community provider guarantees to deliver any business document received from an Freight-X user to the stated receiving Freight-X community provider according to Freight-X specifications in a timely manner.

6.5.2 Freight-X community provider accreditation

Freight-X community providers shall become accredited by entering into a Freight-X "community provider agreement" that commits them to certain levels of service.

NOTE The Freight-X "community provider agreement" is required in order to ensure consistency of the technical standards, specifications, and procedures across the entire Freight-X solution.

6.6 Freight-X user communities

The Freight-X user communities shall include a spectrum of transport involved parties including small and medium-sized enterprises (SMEs) as well as larger business entities. Business entities might include private sector entities doing business with private sector entities, as well as public sector entities doing business with private sector entities. This TS enables multiple businesses engaged in freight movement to have a common foundation agreement on a B-B basis for realizing optimized efficiencies. A Government agency, such as Customs, would only be expected to enter into an agreement on a business basis, not as a representative of the government. Any business or groups of businesses could operate outside the framework of ISO/TS 17187 but would not be able to realize the benefits accorded to parties abiding by the principles embodied in the specification/standard. This is a governance contract for those parties wishing to realize the full benefits of moving freight through a Freight-X arrangement.

Each participant shall join the Freight-X consortium through a formal process of engagement. Each participant shall affiliate with one or more Freight-X community service providers depending upon the set of services consistent with the joining organizations as well as the "focus" of the Freight-X community provider. Each participating organization shall continue to function as its own standalone entity with its normal business and security responsibilities (eg, administration, security, liability).

6.7 Open forum

To promote even wider collaboration, an "open forum for non-consortium members" can additionally be provided as a communication channel for wider industry review and comment on the activities of the Freight-X approach.

NOTE It is to the advantage of the Freight-X user communities to promote wide use of Freight-X. It gives them a broader community to work with and also it offers them a wider choice of partners to choose among related to contractual agreements among the partners.

7 Freight-X Standards

7.1 General

Data exchange standards are at the heart of these rules of governance. The basic premise is that there shall be a common semantic model for data required by Freight-X participants. All standards shall be treated as one through a common semantic interoperability process where a common interchange format is mapped to the other major formats in a cloud-like environment. Since selected US projects and comparable EU projects have been working together on a common framework for data exchange, the OASIS Universal Business Language shall be the Freight-X interchange format. The Freight-X

community shall formalize a process whereby mapping to any other format takes place rapidly, and then once mapped, the translation is immediate for anyone participating in the governance community of users. Each community (eg, EDIFACT, NEAL-NET, GS1) can continue to operate using its own formats as required. Figure 2 presents this concept of a Freight-X hub format. UBL semantics map to all common business data formats with very little need for extension. This means that a user of an industry-specific or proprietary data format need support only one kind of conversion: to and from UBL.

These "hub" standards shall address the semantics, syntax, and interchange of data. Agreement is required at each level to ensure interoperability between freight processes.

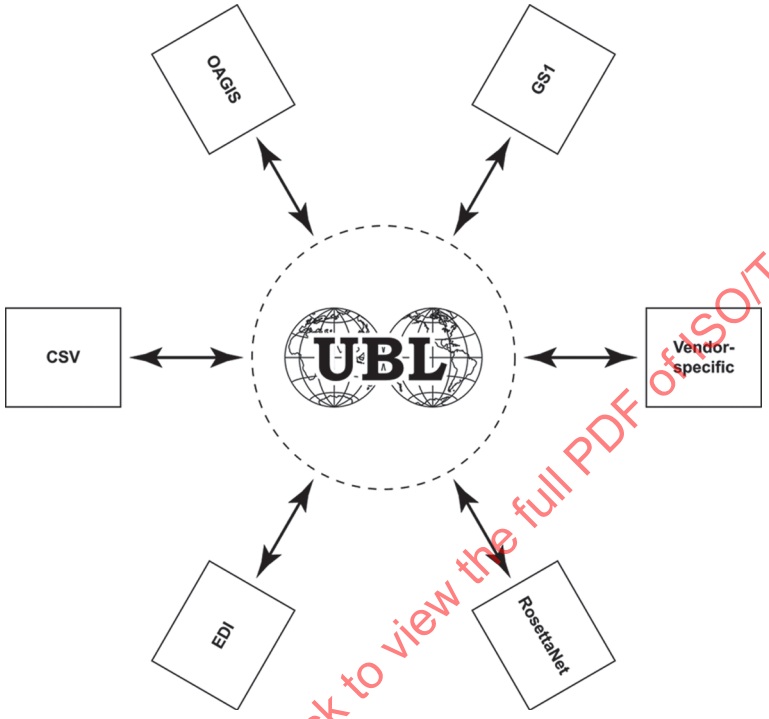

Figure 2 — Freight-X hub format concept

7.2 Semantic Freight-X standards

Regarding the semantics of the information exchanged, the Centre for Trade Facilitation and Electronic Business (UN/CEFACT) of the United Nations supports activities dedicated to improving the ability of business, trade, and administrative organizations to exchange products and relevant services effectively. UN/CEFACT's principal focus is on facilitating national and international transactions through the simplification and harmonization of processes, procedures, and information flows.

A foundation of the work of UN/CEFACT is the "Core Component Technical Specification", ISO/TS 15000-5:2005 Electronic Business Extensible Markup Language (ebXML) — Part 5: ebXML Core Components Technical Specification, Version 2.01. The "Core Components Technical Specification" (CCTS) provides a way to identify, capture and maximize the re-use of business information to support and enhance information interoperability across multiple business situations.

The central concept of the CCTS is the "core component". The "core component" shall be a building block for the creation of a semantically correct and meaningful information exchange package. It shall contain only the information pieces necessary to describe a specific concept. There are four different categories of "core components".

— Basic Core Component (BCC);

— Association Core Component (ASCC);

— Core Component Type (CCT);

— Aggregate Core Component (ACC).

When a “core component” is used in a real business circumstance it shall serve as the basis of a “business information entity”. The “business information entity” is the result of using a “core component” within a specific business context.

NOTE A specific relationship exists between ”core components” and “business information entities”. “core components” and “business information entities” are complementary in many respects. “core components” are intended to be the linchpin for creating interoperable business process models and business documents using a controlled vocabulary.

There are three different categories of “Business Information Entities”.

— Basic Business Information Entity (BBIE);

— Association Business Information Entity (ASBIE);

— Aggregate Business Information Entity (ABIE).

The most primitive of these is the BBIE. A BBIE is a basic “core component” when used in a specific business context.

The Universal Business Language (UBL) is the product of an international effort to define a royalty-free library of standard, electronic business documents built upon a set of internationally recognized common information components based upon the Core Components Technical Specification, Version 2.01.

As one of the first implementations of ebXML “Core Components Technical Specification 2.01”, the UBL library is based on a conceptual model of “Business Information Entities” (BIEs). These components are assembled into specific document models such as “waybill” and “transport status”.

The UBL 2.0 documents and library are designed to support typical transport business processes including an “initiate transport services process” and a “report status of goods process”. These processes define the ordering of logistical services for international trade. With receipt of an order and acknowledgement by the supplier party that the goods are available and ready to be shipped, the consignor or consignee initiates the transportation arrangements. This includes booking the consignment with a “transport service provider” such as the “freight forwarder” or “carrier” and advising the delivery party of the arrangements as needed. UBL document types in these processes are “forwarding instructions”, “packing list”, “waybill”, “bill of lading”, and “transport status”. ISO/TS 24533, Intelligent transport systems – “Electronic information exchange to facilitate the movement of freight – Road transport information exchange methodology” provides a baseline set of generalized transport business processes related to electronic freight management.

7.3 Syntactic Freight-X standards

Developed by a Technical Committee of the Organization for the Advancement of Structured Information Standards (OASIS), the UBL 2.0 XSD schemas are the normative representations of the UBL 2.0 document types and library components (Business Information Entities).

UBL defines standard XML messages to enable direct connection into existing business, legal, auditing, and records management practices, eliminating the re-keying of data in existing fax- and paper-based supply chains. UBL provides an entry point into electronic commerce for small and medium-sized businesses. UBL Version 2.0, was approved as an OASIS standard in December 2006, and defines a generic XML interchange format for business documents that can be extended to meet the requirements of particular industries.

The complete UBL 2.0 release package is available at http://docs.oasis-open.org/ubl/os-UBL-2.0.zip/ and http://docs.oasis-open.org/ubl/os-UBL-2.0-update-delta.zip.

Specifically, UBL 2.0 provides the following:

a) a set of XML schemas for common business documents such as “forwarding instruction“, “transport execution plan”, and “transport status” that are constructed from the UBL library components and can be used in transportation contexts;

b) a library of XML schemas for reusable data components such as “party”, “item”, and “shipment” — the common data elements of everyday business documents;

c) a selected set of code lists and code list schemas. UBL schemas are modular, reusable, and extensible in XML-aware ways;

d) a summary of the UBL documents addressing international and intermodal freight processes is provided in Annexes A and B. UBL 2.0 has been an OASIS specification since calendar year 2005.

NOTE UBL 2.1 is presently undergoing development and public review. It is expected to become a formal OASIS specification during calendar year 2013. See http://docs.oasis-open.org/ubl/UBL-2.1.html.

7.3.1 Specific Freight-X implementation guidelines

The UBL TC has also offered a document entitled, UBL Guidelines for Customization http://docs.oasis-open.org/ubl/guidelines/UBL-Customization1.0.pdf . Those guidelines are intended to aid users in developing custom solutions based on UBL. The goal of these UBL customization guidelines is to maintain a common understanding of the meaning of information being exchanged between specific implementations.

A set of these guidelines shall be created for Freight-X implementations.

7.3.2 Freight-X code lists and code list schemas

Code lists are sets of values valid for a given information entity. A significant feature of the UBL approach to code lists is their separation from the schemas within which the coded information element is employed. With this arrangement, code lists are managed independently from the schemas and can be maintained, updated, and documented on their own schedule. By default, UBL uses several lists of standard codes published by agencies such as ISO and UNECE, as well as various codes that are specific to UBL. Additional detail is provided in Annex C.

7.4 Freight-X document exchange standards

Document exchange standards for Freight-X define the specifications for a lightweight and coherent messaging and trust ICT infrastructure for reliable data exchange, messaging, and web services interoperability between domains. Here, a “domain” can be any community whose members (a) are connected through a shared system, and (b) can interact with others across domains.

These standards are based on a service oriented approach to business web service interfaces using functionality and messaging protocols being developed in the OASIS Business Document eXchange Technical Committee. See https://www.oasis-open.org/committees/documents.php?wg_abbrev=bdxr .

7.5 Freight-X communication exchange standards

Freight-X communication exchange standards include Web Service Description Language to describe the web service interface, and other Service Oriented Architecture Protocol (SOAP) standards. ISO 24097-1 offers a collective set of guidance as an ITS profile supporting ITS web services.

8 Governance of Freight-X standards

8.1 General

The proposed governance model for Freight-X standards is based on the Freight-X governance framework described by the following diagram (Figure 3). This framework depicts the process in which new standards are developed and accepted within the Freight-X consortium.

The key points to this framework are:

— The Freight-X governance model shall be an implementation of this framework.

— The Freight-X messages themselves shall be conformant customizations of the "Organization for the Advancement of Structured Information Standards" (OASIS) UBL standard documents.

NOTE These shall be known as Freight-X message profiles (as shown in Figure 3).

— The "Freight-X governance model" shall define and establish the maintenance processes for the Freight-X message profiles.

— Every implementation of Freight-X shall support the Freight-X message profiles in order to ensure data coherence and semantic consistency.

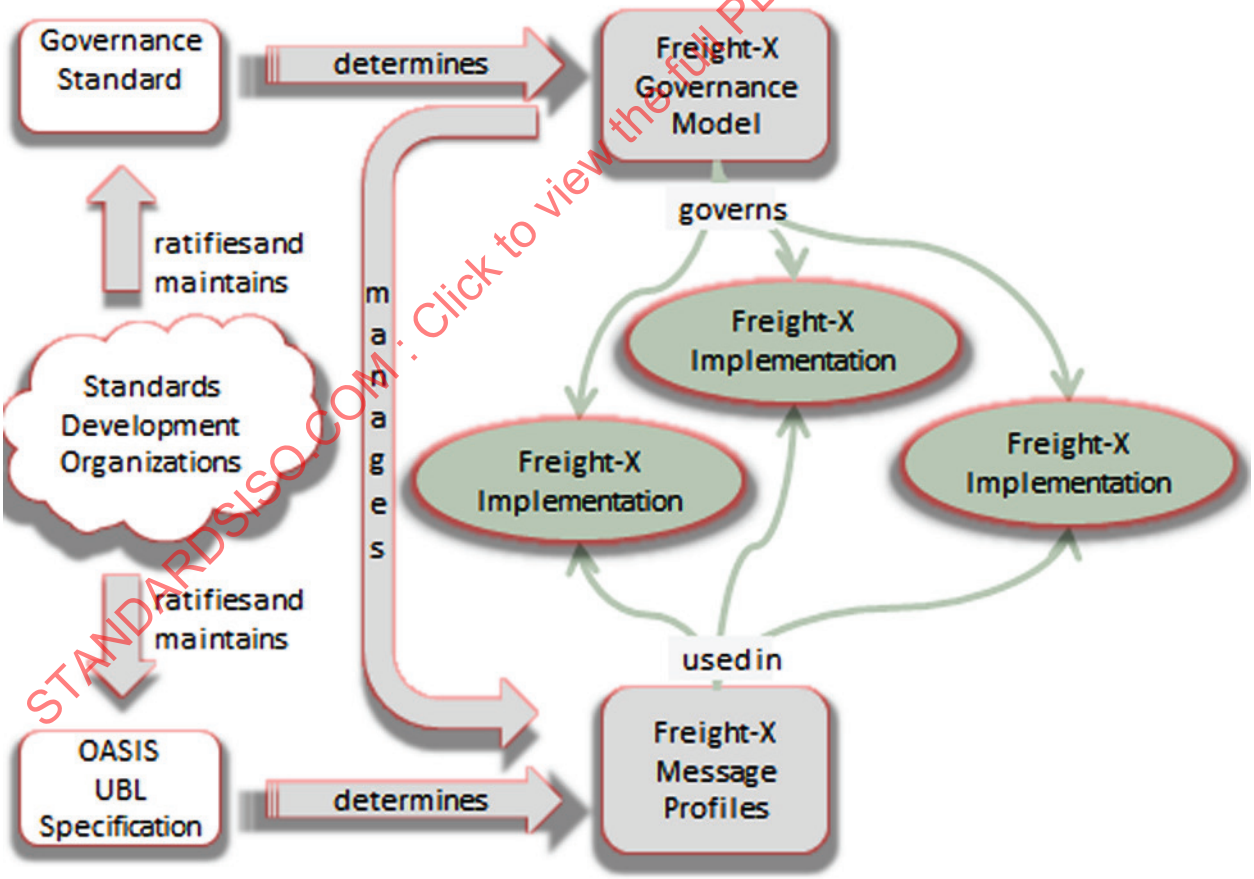

Figure 3 — Framework for Freight-X governance of standards

8.2 Governance of Freight-X message profiles

Freight-X shall employ Universal Business Language (UBL) as the basis for its XML messages. See 7.3 above. Freight-X shall employ these message types as services. The services employed include those necessary to manage "International Freight Processes" (INAT-PRO) as well as "Intermodal Freight Processes" (IMOD-PRO). Examples of INAT-PRO include: receive order, consignment, booking service, confirm booking, load shipment, consignment partners, subscription, receive status, query status, divert shipment, request clearance, and receive clearance. Examples of IMOD-PRO include establishing a transport execution plan, providing an itinerary for a transport service, and reporting transport means progress status.

The subset of information elements for UBL documents used in Freight-X web services shall be known as "Freight-X message profiles".

While the Freight-X program has evolved with its particular strategy, it has parallels in associated domains that have formalized the definition of profiles. Based on work undertaken by the European Committee for Standardization (CEN) Workshop on "Business Interoperability Interfaces on public procurement in Europe" (BII)[3], a profile can be defined as a specification of how one or more Freight-X business processes are executed by specifying the Freight-X business rules governing its business collaborations and the information content (message profile) of the electronic business transactions exchanged.

In order to support the exchange of Freight-X business documents in an open and interoperable manner, the "message profiles" within Freight-X shall be described with an aim to function as part of a formal agreement. This shall be done in order to lower one of the main barriers to the efficient and effective implementation of Freight-X that is the need to entering into bilateral agreements with each business partner. By publishing profile descriptions, organizations implementing Freight-X can claim conformance to the profile. In doing so, the organization is committing to all aspects of the "message profile" and thus limiting the need for further bilateral agreements.

A "Freight-X message profile" shall provide a description of the information content of the electronic business transactions exchanged by pointing to a given data model for each of the business transactions.

Not all implementations can use the same information elements for the UBL documents used in their electronic transactions. Therefore a "core" profile of the common elements which can be used in every pilot implementation has been prepared. Adherence to these "Freight-X message profiles" shall form part of the "Freight-X community agreement".

8.3 Governance of Freight-X support data/code lists

Governance of support data such as code lists employed in Freight-X implementations, shall be the responsibility of the Freight-X governing body.

8.4 Governance of Freight-X communication exchange standards

Governance of Freight-X communication exchange standards employed in Freight-X implementations shall be the responsibility of the Freight-X governing body. Where web services are employed, they shall be based upon a profile of standards agreed upon by the Freight-X consortium. Standards to be considered shall include ISO 24097-1, Using web services (machine – machine delivery) for ITS service delivery – Part 1: Realization of interoperable ITS web services as well as OASIS SOA specifications.

9 Freight-X security

This Technical Specification incorporates by reference other guiding standards related to the security of freight operations (ISO 28000, parts 1-5). Changes to accommodate this issue have been made in 6.6. Freight-X user communities. Role-based Access Control (RBAC) should be the means by which the ability to access system resources is explicitly enabled or restricted by the Freight-X user's assigned role information. In a Freight-X community, each Freight-x user will be assigned one or multiple roles and each

3) CEN/WS/BII CWA 16558 – Guideline - Profile Architecture Version 2, 2012-06-28

role is mapped to a set of pre-defined functions that can be performed by that role. The access control manager is responsible for extracting user credentials as well as the service that is being requested. It also interacts with two other security modules in order to determine whether the request should be granted or denied.

a) The resource permission module helps determine the required roles for a given resource by consulting a resource-to-roles mapping table.

b) The authorization table module consults a role-to-user mapping table to determine whether a client is granted one of the required roles.

For the Freight-X environment, the following high level user roles have been identified:

a) consignor – the party consigning goods as stipulated in the transport contract;

b) consignee – the party receiving a consignment of goods as stipulated in the transport contract;

c) transport service provider – the provider of transport services (i.e. freight forwarder);

d) carrier – a company which provides transport services (i.e. airlines, trucking companies);

e) terminal operator – the party with operational responsibilities at origin or destination nodes for freight transport journeys (i.e. overseeing the unloading of goods, checking the quantity of goods against the manifest, transferring of the goods, checking documents, authorizing a carrier to pick up goods);

f) logistic service provider – the party providing logistic services such as warehousing, re-packing products, distribution, and assembly (i.e. third party logistic provider, container freight station);

g) customs broker – the party who is licensed to enter and clear goods through customs. The responsibilities of a broker include preparing the entry form and filing it, advising the importer on duties to be paid, advancing duties and other costs, and arranging for delivery to the importer.

Each of the above user roles shall also be mapped to a set of pre-defined functions that can be performed by that role.

By implementing RBAC, effective granular security can be enforced so that each supply chain partner can only perform those functions that are associated with its user roles. A shipment is handled by only a small set of supply chain partners and shipment visibility and status updates shall be restricted to this set as well; therefore, it is crucial to be able to manage the supply chain partner list for each shipment.

NOTE Supply chain partners on this list are not always known a-priori. For example, freight forwarders might need to know shipment details such as container weight, container dimensions, end delivery locations, and desired arrival schedule before it contracts with one of the multiple trucking companies with which they regularly do business. Additionally, in case of expediting late shipments, or handling split shipments, the next supply chain partner might need to be changed dynamically while the shipment is en route.

Since the authentication function in a supply chain partner's web service shall first determine if the requestor is a member of this list before granting read and/or update access, the following services and access controls shall be implemented:

— for a given shipment, create a partner list repository;

— provide a service which takes as input a supply chain partner's identity and a shipment's identifier, and returns an indication of whether that supply chain partner is a partner for that shipment.

In general, read access shall be granted to all partners on the list, but write access shall be restricted to only those partners serving in the capability of a user role with appropriate write/update privileges. The following role-based access control logic should be applied when a web service request is received by a supply chain partner:

1) perform a message integrity check by using the attached requestor's public key to verify the digital signature on the message;

2) check the signing certificate's validity by validating the signer's certificate to ensure that it has not been reported as revoked by the issuer, and ensuring the signer's certificate is issued from a trusted Certificate Authority (CA);

3) check to ensure that the requestor is a member of the "Friends of the Shipment" registry;

4) determine the requestor's user role and whether the requestor's role permits the execution of the requested web service.

10 Engagement scenario

10.1 General

A business entity shall get engaged in the Freight-X process through the following steps:

a) application to the consortium;

b) registration/Identification;

c) authentication;

d) authorization/certification;

e) operation.

10.2 Maintenance and support policy

The key component of Freight-X governance is establishing a registry to host all the participant services and necessary instructions on how to connect with other Freight-X participants. A Freight-X service provider to the Freight-X consortium would be a logical option to set up the registry.

NOTE An example of that process is expected to be developed in the United States in 2012–2013 with their Electronic Freight Management (EFM) initiative.

10.3 Maintenance tools

When developing specifications for Freight-X, the tools used should not restrict its design or lock-in community providers to also use that tool. This means artefacts produced shall be portable across different tools and technologies.

With respect to Freight-X maintenance, there are specific requirements for any tools used for its maintenance.

— allow the production of compatible and conformant UBL customizations;

— approved organizations can produce conformant standard UBL adaptations;

— access to community providers to produce national customizations of Freight-X standards [which are either compatible or conformant];

— allows developers to generate output in interoperable formats for standard adaptations and national customizations;

— allow other non-member organizations to produce their own customizations;.

— maintain code lists and code list extensions;

— allows user access to different layers for viewing.

10.4 Intellectual property policy

Any Intellectual Property Rights held related to Freight-X can be licensed to the consortium under a reasonable and non-discriminatory license (RAND). The annual fee would be established by negotiations between the consortium and the IPR holder.

The consortium members shall be allowed to distribute sub-licenses to their community participants at no charge. In effect the license fee per member is covered by part of the cost of membership to the consortium.

The next major release of Freight-X will be owned by the Freight-X consortium and can be offered to the members under a royalty free license.

10.5 Financial model

For Freight-X to flourish in the industry the overall process to join and use any of the services available shall be easy and relatively inexpensive to use. There will need to be an initial investment from some organization(s) that has/have established a business model/plan to implement a UDDI/registry and/or repository. The Freight-X registry is analogous to the "yellow pages" for those participating in the Freight-X program. Any partner/user wishing to advertise an available "web service" can post their "web service instructions" on the registry for a fee.

11 Implementation plan

11.1 General

The Freight-X community provider plays a key role in the area of facilitating transactions, caching transaction information, maintaining supply chain partner lists and managing the Universal Description, Discovery and Integration (UDDI) registry. The implementation responsibilities for a Freight-X community provider lie in the following key areas:

11.2 Set up ICT infrastructure

The first step in implementation is to establish the necessary information and communications technology infrastructure. In order to do so, the Freight-X community provider needs to gather requirements, identifying the business objectives for the needs of each supply chain partner (Freight-X user). Some of the key questions that need to be answered to help in capacity planning and technology adoption are the following:

a) What is the size of the platform? (e.g. expected number of Freight-X users, estimated volume of transactions)

b) What are the goals of service level agreement in terms of availability and response time of the implemented web services?

c) How secure and flexible does the platform need to be? (e.g. types of data formats supported, security standard compliance requirements)

d) What type of ICT infrastructures do Freight-X users have?

11.3 Implement Freight-X data model

The Freight-X data model is the repository place for caching transactional data and providing transport status information related to each Consignment. A high level logical data model (reference data model) should be developed by the Freight-X governing body and the Freight-X community provider should download a copy of it to use as a baseline. The logical data model identifies most of the key entities and their attributes within the supply chain domain. It also gives implementers the flexibility to extend the data model in order to accommodate requirements that are unique and specific to a particular supply chain. The implementation of the logical data model also requires that a caching mechanism is put in

place so that transactional data are not permanently stored in a central place yet the efficiency and convenience of executing collaborative queries is preserved.

11.4 Implement UDDI registry

The UDDI registry is the central repository place for web service information published by different supply chain partners. Administering and maintaining a UDDI registry enables supply chain partners to publish, discover and invoke web services developed by their business partners. One of the key benefits of having a UDDI registry is that it allows seamless and easy system integrations because it provides the flexibility and reusability to dynamically discover and bind web services.

11.5 Implement ESB component

Enterprise Service Bus (ESB) is an evolving integration architecture pattern used to integrate different incompatible business systems. It allows different business systems to have a uniform mechanism to communicate across environments and provides a "plug and play" capability for any new systems. ESB has become one of the main technologies supporting SOA-based solutions. Two major functionalities provided by ESB are message translation and message routing (either itinerary-based routing or content-based routing). Leveraging the features of an ESB component alleviates the burden on supply chain partners to provide end-to-end integration with their business partners. It also gives the Freight-X community provider the ability to monitor the performance of the system as well as provide better error handling. However, because of the cost and complexity associated with implementing an ESB component, whether the operator needs to adopt ESB technology really depends on the specific business requirements and needs of the platform.

11.6 Define message profiles

In order to seamlessly integrate different types of systems within the supply chain domain, a message profile needs to be defined so that all the systems can communicate through the same message format. The Freight-X governing body is responsible for defining and publishing the message standard for use among its user community.

11.7 Implement Freight-X consortium portal

The main purpose of the portal is to give SMEs an easy way of participating in partner transactions. Since SMEs might have insufficient IT infrastructure and resources to fully implement a SOA-based solution, the portal will allow them to exchange data with their supply chain partners through a web-based graphic user interface. Besides developing a web interface for SMEs to manually input transactional data, the Freight-X governing body is also responsible for developing file templates for SMEs to download from the portal. File templates are intended to assist SMEs with data entry by allowing them to fill data offline and upload it back to the portal.

11.8 Implement consortium ICT infrastructure services

Based on the architecture design, a number of infrastructure services need to be implemented by the Freight-X community provider in order to facilitate transactions among Freight-X users. Those ICT infrastructure services should include, but not be limited to, the following services:

a) Registration service: The registration service shall provide functionality that allows supply chain partners to register their business information with the consortium operator. During the initial registration process, the supply chain partners should, at a minimum, provide information such as business entity name, address, point of contact and role (s).

b) Authentication and authorization services: Security interfaces shall be used to effectively protect the information assets of each supply chain partner. The consortium operator needs to implement robust and secure authentication and authorization services.