INTERNATIONAL STANDARD

ISO/IEC 15944-9

Second edition
2023-06

Information technology — Business operational view —

Part 9: Business transaction traceability framework for commitment exchange

Technologies de l'information — Vue opérationnelle des affaires —

Partie 9: Cadre de traçabilité des transactions d'affaires pour l'échange d'engagements

Reference number
ISO/IEC 15944-9:2023(E)

© ISO/IEC 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO/IEC 2023 – All rights reserved

Contents

Page

Foreword ..... **vii**
Introduction ..... **viii**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
4 Abbreviated terms **18**
5 Principles and assumptions **18**
5.1 Overview 18
5.2 Important Open-edi characteristics that provide support for traceability 19
5.3 Principles for traceability 20
5.3.1 Overview of the principles 20
5.3.2 Traceability principle 1: Unambiguous identification 20
5.3.3 Traceability principle 2: Record-keeping 20
5.3.4 Traceability principle 3: Defined level of granularity 21
5.3.5 Traceability principle 4: Ensuring traceability among parties 21
5.3.6 Traceability principle 5: Precision in temporal and/or location referencing 21
5.4 Two types of tracking 22
6 Traceability reference model **22**
6.1 General model 22
6.2 Traceability data in business transaction 23
6.2.1 Predefined and structured traceability data 23
6.2.2 Predefined contents of traceability data 23
6.3 General content of traceability data 25
6.3.1 General rules for identification of BTEs 25
6.3.2 Integration and interoperability of identification schema 26
6.3.3 Identification and description of traceable commitments and non-traceable commitments. 28
6.3.4 Rules governing unambiguous identification of Person in support of traceability requirements 29
6.3.5 Business event 29
7 Traceability requirements to business transaction components **31**
7.1 Overview 31
7.2 General requirements 31
7.2.1 Key components of a business transaction 31
7.2.2 Commitment exchange 31
7.3 Traceability requirements on Person 31
7.3.1 General requirements on Person 31
7.3.2 Requirements on a regulator 32
7.3.3 Requirements on a buyer 32
7.3.4 Requirements on Person as an individual — Privacy protection and individual accessibility requirements 32
7.4 Traceability requirements on process 33
7.5 Traceability requirements on data 34
7.5.1 Overview 34
7.5.2 Traceability data retention 34
7.5.3 State changes 34
7.5.4 Business transaction ID 34
7.5.5 Unambiguous traceability data 34
7.5.6 Traceability data sharing 35
7.5.7 Master data (in a business transaction) 35
8 Open-edi collaboration space and traceability **35**

© ISO/IEC 2023 – All rights reserved

8.1 Overview ... 35
8.2 Basic Open-edi collaboration space: Independent view of traceability ... 36
8.3 Collaboration space: Roles of buyer, seller and regulator ... 36

9 Traceability attributes for Open-edi scenario ... 37
9.1 Overview ... 37
9.2 Template structure and contents ... 37
9.3 Template for specifying the scope of an Open-edi scenario — Traceability requirements perspective ... 37

Annex A (normative) **Consolidated controlled vocabulary definitions and associated terms, as human interface equivalents (HIEs), English and French language equivalency in the IT standardization context ... 42**

Annex B (informative) **Introduction to GS1 Glossary ... 45**

Annex C (informative) **Date/time referencing ... 49**

Annex D (informative) **Introduction to ISO/IEC 15944-5:2008, Annex D and Annex E regarding business location ... 50**

Annex E (informative) **Samples of international standards or specifications in support of traceability requirements ... 51**

Annex F (informative) **Mapping of BTEs through their identifiers in a traceability framework ... 52**

Annex G (Informative) **Introduction to sample regulations as the sources of requirements of traceability ... 55**

Annex H (Informative) **Exclusions and aspects not currently addressed to the scope ... 57**

Bibliography ... 59

© ISO/IEC 2023 – All rights reserved

List of Figures

Figure 1 — Open-edi environment ..... **ix**
Figure 2 — Integrated view — Business Operational Requirements ..... **xi**
Figure 3 — Model of traceability concepts **22**
Figure 4 — Focus of BOV Open-edi standardization work required by traceability — Predefined and structured traceability data **23**
Figure 5 — Content model for traceability in a business transaction **24**
Figure 6 — Identification radar: What it covers **26**
Figure 7 — Commitments including traceable and non-traceable commitments **28**
Figure 8 — Information model of business event **30**
Figure 9 — Collaboration space with regulator as external constraints of traceability **36**
Figure F.1 — Entity and entity Mapping **52**
Figure F.2 — Chain of commitment exchange traceability mapping among entity identifiers **53**
Figure F.3 — Traceability route in a food business transaction with multi-parties **54**

© ISO/IEC 2023 – All rights reserved

List of Tables

Table 1 — Attributes for scenario scoping **37**

© ISO/IEC 2023 – All rights reserved

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 document 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 or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

This second edition cancels and replaced the first edition (ISO/IEC 15944-9:2015), which has been technically revised.

The main changes are as follows:

— Clause 1 (Scope) has been amended to move the detailed description of "Exclusions" and "Aspects not currently addressed" to a separate informative annex;

— entries in Clause 2 and Clause 3 have been removed to be more conformant to ISO Directives;

— definitions in Clause 3 have been updated to be aligned with other referenced source definitions;

— clauses and annexes have been aligned to changes in ISO/IEC JTC1 Directives, Part 2;

— there are minor edits of a temporal nature with respect to dated references, changes in URLs referenced, minor edits, change of font to Cambria, as well as application of the new “ISO House Style”, etc.

A list of all parts in the ISO/IEC 15944 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

© ISO/IEC 2023 – All rights reserved

Introduction

0.1 Purpose and overview

Modelling of a business transaction through scenarios and scenario components is done through specifying the applicable constraints using explicitly stated rules. The Open-edi Reference Model identified two basic classes of constraints, namely, "internal constraints" and "external constraints". External constraints apply to most business transactions.

Jurisdictional domains are the primary source of external constraints on a business transaction. Traceability requirements in turn are a common requirement of most jurisdictional domains, although they may result from explicit scenario demands from or on the parties to a business transaction, as well as the goal, i.e., nature of the business transaction. The internal constraints are imposed in Open-edi due to mutual agreements among parties to a business transaction and the external constraints are invoked by the nature of a business transaction due to applicable laws, regulations, policies, etc. of jurisdictional domains which need to be considered in Open-edi business transactions. All requirements in this document originate from external constraints. However, parties to a business transaction may well by mutual agreement apply external constraints of this nature as internal constraints.

In the actualization and post-actualization phases of a business transaction, traceability is needed for the movement of goods, services and/or rights from seller to buyer, and for the associated payment from buyer to seller. The focus therefore of this traceability framework standard is on commitment exchange among autonomous parties to a business transaction.

This document presents a framework consisting of several models, including a reference model, a model of concepts, a content model, an information model, as well as rules, templates and other technical specifications for traceability requirements based on internal or external constraints as applicable to a business transaction.

0.2 ISO/IEC 14662 "Open-edi Reference Model"

ISO/IEC 14662[1)] provides the conceptual architecture necessary for carrying out electronic business transactions among autonomous parties. That architecture identifies and describes the need to have two separate and related views of the business transaction. The first is the Business Operational View (BOV), the second is the Functional Service View (FSV). ISO/IEC 14662:2010, Figure 1 illustrates the Open-edi environment.

1) ISO/IEC 14662(E/F) is an English/French, side-by-side, International Standard. Its 2010 3rd edition has become a stabilized standard and is now also an ISO/IEC declared "horizontal" standard, i.e., one serving as a base standard for those developing standards in the various fields of EDI, including eBusiness. The stabilized status of ISO/IEC 14662 was re-affirmed for another 10 years by ISO/IEC JTC1 in 2021. ISO/IEC 14662 has since its 1997 1st edition been an ISO/SO freely available standard. [See further https://standards.iso.org/ittf/PubliclyAvailableStandards/index.html]

© ISO/IEC 2023 – All rights reserved

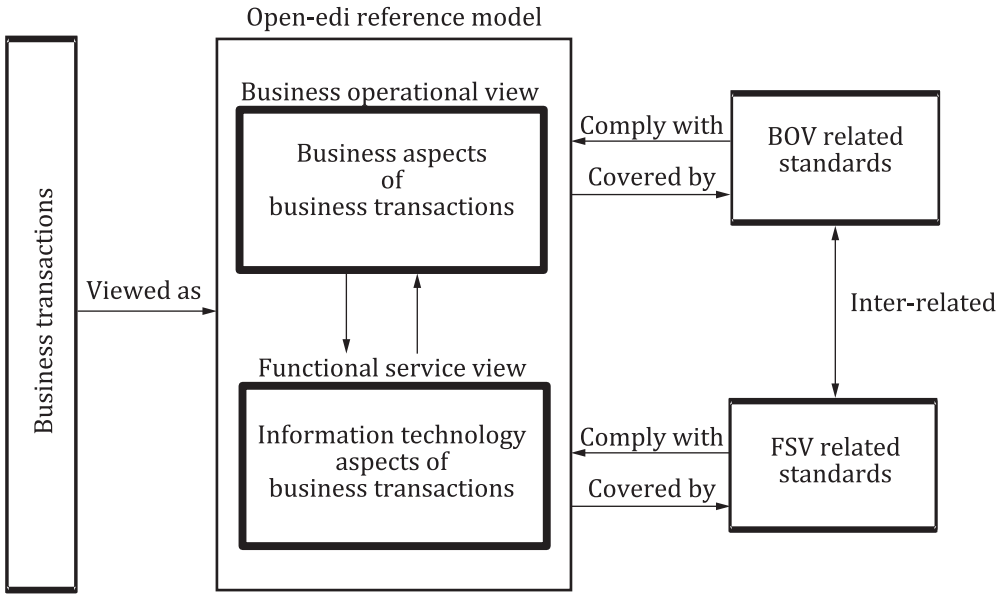


Figure 1 — Open-edi environment

According to ISO/IEC 14662:2010, Clause 5:

"*The intention is that the sending, by an Open-edi Party, of information from a scenario, conforming to Open-edi standards, shall allow the acceptance and processing of that information in the context of that scenario by one or more Open-edi Parties by reference to the scenario and without the need for agreement. However, the legal requirements and/or liabilities resulting from the engagement of an organization in any Open-edi transaction may be conditioned by the competent legal environment(s) of the formation of a legal interchange agreement among the participating organizations. Open-edi Parties need to observe rule-based behaviour and possess the ability to make commitments in Open-edi, (e.g., business, operational, technical, legal, and/or audit perspectives)*".

See also ISO/IEC 14662:2010, Figure A.1.

This document is a BOV standard which focuses on the business operational view (including internal constraints as well as external constraints) for the application of traceability from an Open-edi perspective, and, as required, follow-up standards development in support of the "Open-edi Reference Model".

The purpose of this document includes identifying the means by which laws and regulations of a jurisdictional domain impact scenarios and scenario components as external constraints and how they are modelled and represented.

Finally, it is noted that the approach taken in ISO/IEC 15944-1:2023, Clause 7 is, as stated in ISO/IEC 15944-1:2023, 7.1:

"... that of identifying the most primitive common components of a business transaction and then moving from the general to the more detailed, the simplest aspects to the more complex, from no external constraints on a business transaction to those which incorporate external constraints, from no special requirements on functional services to specific requirements, and so on".

This document focuses on addressing generally definable aspects of both internal constraints relating to traceability which is mutually agreed to by parties to a business transaction, and external constraints for which the source is a jurisdictional domain. A useful characteristic of external constraints is that at the sector level, national and international levels, etc., focal points and recognized authorities often already exist. The rules and common business practices in many sectorial areas are already known. Use of ISO/IEC 15944 series (and related standards) will facilitate the transformation of these external constraints as business rules (see 0.5) into specified, registered, and re-useable scenarios and scenario components.

© ISO/IEC 2023 – All rights reserved

0.3 ISO/IEC 15944-1: Business Operational View (BOV) — Operational aspects of Open-edi for implementation

ISO/IEC 15944-1 identifies and enumerates the many requirements of the BOV aspects of Open-edi in support of electronic business transactions. These requirements need to be taken into account in the development of business semantic descriptive techniques for modelling e-business transactions and components thereof as re-useable business objects. They include:

a) commercial frameworks and associated requirements;

b) legal frameworks and associated requirements;

c) public policy requirements, particularly those of a generic nature such as consumer protection, privacy, and accommodation of handicapped/disabled;

d) requirements arising from the need to support cultural adaptability. This includes meeting localization and multilingual requirements (e.g., as may be required by a particular jurisdictional domain or desired to provide a good, service and/or right in a particular market).

e) in specifying scenarios, scenario components, and their semantics in the context of making commitments, one needs to distinguish between:

   1) the use of unique, unambiguous and linguistically neutral identifiers (often as composite identifiers) at the information technology (IT) interface level among the IT systems of participating parties on the one hand; and, on the other,

   2) their multiple human interface equivalent (HIE) expressions in a presentation form appropriate to the Persons involved in the making of the resulting commitments. (See ISO/IEC 15944-10:2023, 5.4). It is the intention of this document that the modelling of scenario and its components about traceability takes this approach.

Figure 2 provides an integrated view of these business operational requirements. Figure 2 is based on ISO/IEC 15944-1:2023, Figure 3. The focus of this document is that of internal and external constraints, and those constraints about traceability may be either from legal requirements[2)], commercial requirements[3)], or public policy requirements[4)], which are the shaded "clouds" in Figure 2, while other sources for external constraints than traceability is represented in Figure 2 as "clouds" not shaded.

2) One example of the legal traceability requirement can be the EU EC N78/2002, which is obligatory and contains traceability requirement for the purpose of food safety.

3) The commercial framework is mostly "for profit" activities among private companies and individuals, where features of traceability in a product may be required by or provide added benefit to the customer.

4) One example of the traceability public policy requirement can be "The 12th Five Year Plan on National Food Safety Supervision System" issued by state council of China.

© ISO/IEC 2023 – All rights reserved

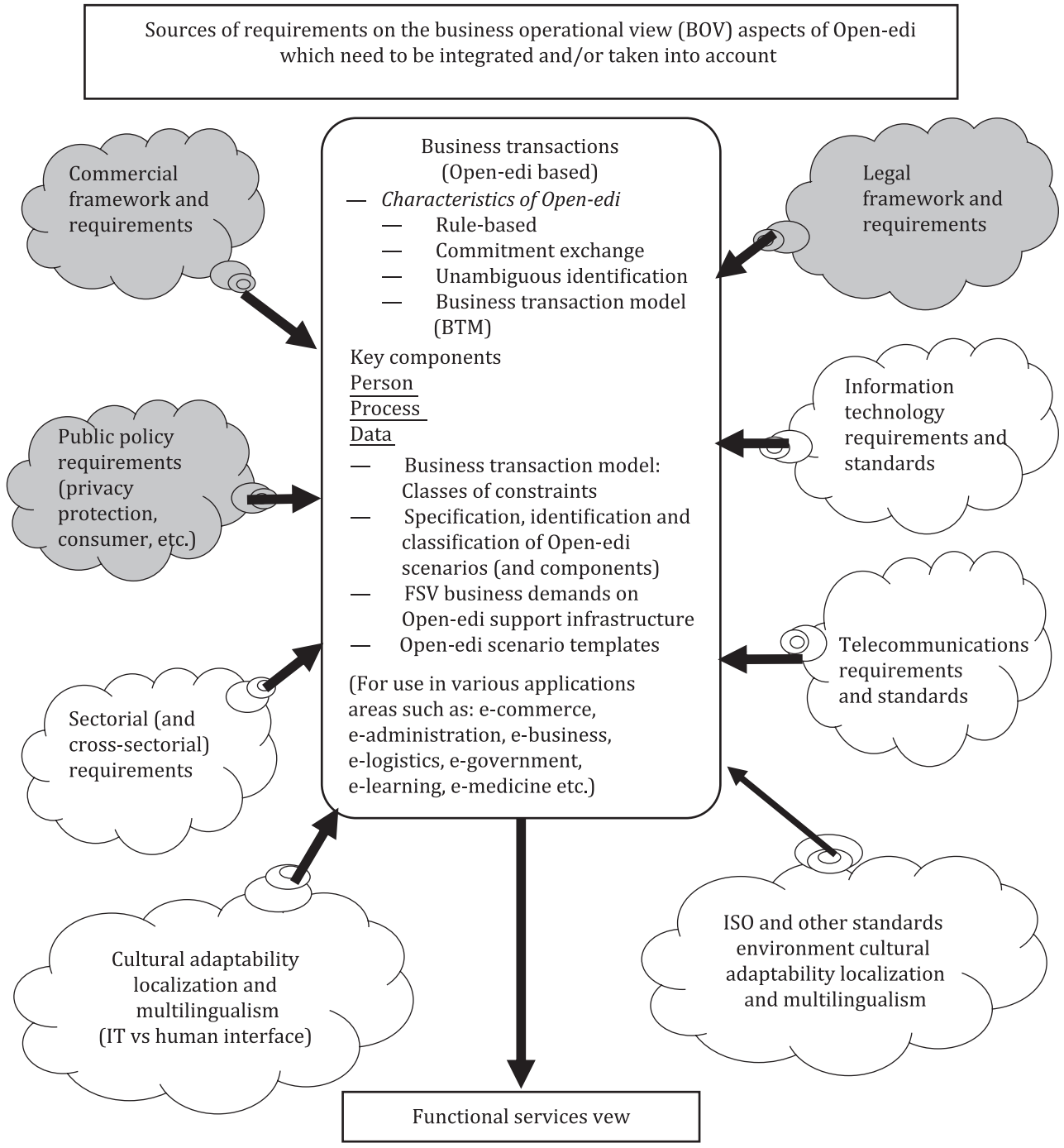


Figure 2 — Integrated view — Business Operational Requirements

0.4 "Traceability" in the context of business transaction and commitment exchange

Traceability in a business transaction originates from the (common) legal practices in jurisdictional domains that require the identification and verification of any non-conformance with applicable legal/ regulatory requirements pertaining to the goal of the business transaction including the ability to withdraw and/or recall products, services and/or rights. The requirements for traceability in a business transaction to support constraints (internal and external) include the need:

a) to fulfil any local, regional national or international regulations or policies, as applicable;

b) to meet the requirement of reporting by the seller to the regulator;

© ISO/IEC 2023 – All rights reserved

c) to meet the labelling requirements of applicable regulators;

d) to support safety and/or quality objectives;

e) to determine the history or origin of the products;

f) to facilitate the withdrawal and/or recall of products;

g) to identify the responsible organizations in case of emergency;

h) to facilitate the verification of specific information about the product;

i) to meet consumer specification(s);

j) to meeting post-actualization requirements such as refund policy, product recall, warranty issue, etc.

k) to meet the requirements of mutual agreement among parties to a business transaction;

l) to communicate information to relevant stakeholders and consumers.

In the Open-edi context, commitment exchange is added to information exchange, and entities are unambiguously identified. With the requirements imposed internally or externally, the business transactions are automated based on Open-edi system. In order to model the business transactions that meet the requirements of traceability, there needs to be considerations on those specific requirements on traceability to a business transaction, including the principles, methodologies for information modelling, and requirements to components of a business transaction, etc.

This document adopts a top-down approach for an Open-edi based traceability framework for commitment exchange, and associated accountabilities, among parties to a business transaction. As such, it will assist implementers and standards developers from a business operational perspective in considering or developing the framework, and/or strategies to support traceability requirements in e-commerce, e-logistics, e-learning, e-medicine, e-government, etc.

For example, business analyser(s) and/or system designer(s) can consider and/or incorporate the rules stated in this document in developing the architecture of business transaction. The incorporation of these rules can be done either by understanding and adopting the requirements reflected in these rules, or by transforming these rules in IT-enabled format and integrating them in the system configuration.

0.5 Representation of rules and guidelines

As defined in 5.1 and ISO/IEC 15944-1:2023, 6.1.2, this document uses the "rule-based" approach, and the common rules are sequentially enumerated and presented in **bold** font, while guidelines which are provided for a rule are numbered sequentially after that rule and are shown in **bold** and ***italic*** font. For example, in ISO/IEC 15944-1:2023 "Guideline 5G2" equals the second Guidelines under Rule 5. The same approach is taken in this document.

Conformance to this document is based on the conformance to the rules stated in this document.

0.6 Organization and description of document

This document consists of nine clauses, one normative annex and five informative annexes. The first four clauses are normative to all standards, i.e., scope, normative references, terms and definitions, and symbols and abbreviations. The remaining five clauses of this document are normative and as follows.

— Clause 5 presents the principles and assumptions about traceability put in an Open-edi context. These principles are fundamental to the understanding of other clauses, and thus contain no rules or Guidelines. Also, a categorization of two types of practices of traceability is described in this clause as an assumption.

— Clause 6 provides the traceability framework as a reference model.

— Clause 7 states the requirements of traceability that affect different aspects of a business transaction.

© ISO/IEC 2023 – All rights reserved

— Clause 8 introduces aspects of Open-edi collaboration space that are affected by traceability requirements.

— Clause 9, as with other parts of ISO/IEC 15944, provides a template of attributes for scenario and scenario components.

— Annex A (normative) provides the English and French language equivalents for terms and definitions found in Clause 3 which are introduced for the first time, i.e., are not found in the existing parts of ISO/IEC 15944 series as well as ISO/IEC 14662.

— Annex B (informative) introduces the GS1 glossary so that readers are able to understand the concept of interoperability of this document and the GS1 traceability specifications.

— Annex C (informative) introduces date/time-based referencing on ISO/IEC 15944-5:2008, 6.6.4.5 that are used by Open-edi implementations in order to ensure that these traceability attributes are identified correctly.

— Annex D (informative) introduces codes for the identification of business locations by jurisdictional domains including their official (or de facto) languages. Annex D is based on and summarizes normative text found in ISO/IEC 15944-5:2008 which includes country codes representing UN member states so that Open-edi implementations adhere to the traceability requirements of jurisdictional domain(s) for stating business locations.

— Annex E (informative) provides samples of other international standards or specifications that support traceability; namely: ISO 26324; ISO/IEC 15459, ITU-T X.660, UN/CPC, UN/SPSC and WCO/HS.

— Annex F (informative) provides a mapping of BTEs using identifiers in a traceability framework for the purposes of supporting the design of information systems and other necessary instrument enabling traceability.

— Annex G (informative) introduces samples of regulations as sources of traceability requirements.

— Annex H (informative) describes the exclusions to the scope of the document and aspects of traceability requirements that are currently not addressed in the current edition of this document.

The document concludes with a bibliography citing references to both ISO and ISO/IEC international standards (which are not used as Normative References in Clause 2), and other relevant documents.

© ISO/IEC 2023 – All rights reserved

Information technology — Business operational view —

Part 9: Business transaction traceability framework for commitment exchange

1 Scope

This document:

— specifies a group of structured and inter-related concepts pertaining to traceability as a legal or regulatory requirement in the Open-edi context, in addition to concepts that appear in other parts of ISO/IEC 15944 series these concepts having the characteristics of cultural adaptability through the use of multilingual terms and definitions;

— provides additional specifications for Open-edi scenarios and scenario components from the perspective of traceability as required by internal or external constraints in business transactions;

— provides a more detailed specification for business transactions regarding aspects of traceability, including refined models of Person, Data and Process in support of the ability for Open-edi to incorporate elements or characteristics of traceability in its information bundles (including their semantic components) and business processes;

— realizes specifications and descriptions from the traceability requirements as rules and guidelines, to provide recommendations or guidance on Open-edi practices; and,

— provides revised primitive Open-edi scenario templates for traceability, integrating the modifications to the template from other existing parts of ISO/IEC 15944 series.

This document can be used by Open-edi implementers (including business modellers and system designers) and Open-edi standard developers in specifying Open-edi scenarios, developing Open-edi related standards, and implementing Open-edi rules and guidelines for Open-edi activities.

This document does not specify the FSV aspects of traceability, internal behaviour requirements of an organization, or traceability as a metrological concept. Detailed exclusions to the scope of this document are provided in Annex H.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15944-1:2023, *Information technology — Business operational view — Part 1: Operational aspects of Open-edi for implementation*

ISO/IEC 15944-5:2008, *Information technology — Business operational view — Part 5: Identification and referencing of requirements of jurisdictional domains as sources of external constraints*

ISO/IEC 15944-8:2012, *Information technology — Business operational view — Part 8: Identification of privacy protection requirements as external constraints on business transactions*

ISO/IEC 15944-10:2023, *Information technology — Business operational view — Part 10: IT-enabled coded domains as semantic components in business transactions*

© ISO/IEC 2023 – All rights reserved