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Information technology — Cloud computing — Framework of trust for processing of multi-sourced data

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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).

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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.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 38, *Cloud Computing and Distributed Platforms*.

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.

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Introduction

There are many business and technical aspects relating to the processing of multi-sourced data, but trust between cloud service users, cloud service customers and the cloud service provider(s) is a significant market issue.

Cloud processing of multi-sourced data is in its early stages of development in the industry, and it is anticipated that specific customer requirements will differ and will evolve over time. Industry clouds have begun to form, and in some cases, their primary purpose is to bring multi-sourced data together from participants in specific industry or community sectors to achieve common objectives. Trust may be required in these scenarios because of regulations, agreements or policies attached to the data.

Processing of multi-sourced data will be essential to artificial intelligence applications along with machine learning on financial, transportation, energy, manufacturing, agricultural and government data. Trust in the data, in the cloud service provider(s), in the processing functions, in the outcomes and among the parties is essential to the success of these projects.

The elements of trust described in this report pertain to Personally Identifiable Information (PII), Organizational Confidential Data (OCD) or any other kind of data that can be a part of multi-sourced data.

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Information technology — Cloud computing — Framework of trust for processing of multi-sourced data

1 Scope

This document describes a framework of trust for the processing of multi-sourced data that includes data use obligations and controls, data provenance, chain of custody, security and immutable proof of compliance as elements of the framework.

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 17788, *Information technology — Cloud computing — Overview and vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 17788 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
chain of custody
demonstrable possession, movement, handling, and location of material from one point in time until another

[SOURCE: ISO/IEC 27050-1:2016, 3.1]

3.2
data
recorded information

[SOURCE: ISO 22005:2007, 3.11]

3.3
data processing
systematic performance of operations upon data

[SOURCE: ISO 2382:2015, 2121276, modified — Notes 1 to 4 to entry have been deleted and the alternate term “automatic data processing” has been deleted.]

3.4
data set
logically meaningful grouping of data

[SOURCE: ISO 8000-2:2018, 3.2.4, modified — EXAMPLES 1 and 2 have been deleted.]

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3.5
multi-sourced data
data that consists of separate data sets that have been generated by multiple, diverse sources and assembled by one or more cloud services from one or more CSPs

Note 1 to entry: The data sets are then subject to combined analysis and processing with the aim of extracting insights and information not obtainable through analysis of each dataset on its own.

3.6
personally identifiable information
PII
any information that (a) can be used to identify the PII principal to whom such information relates, or (b) is or might be directly or indirectly linked to a PII principal

[SOURCE: ISO/IEC 29100:2011, 2.9, modified — The NOTE has been deleted.]

3.7
trust
degree to which a user or other stakeholder has confidence that a product or system will behave as intended

[SOURCE: ISO/IEC 25010:2011, 4.1.3.2]

4 Symbols and abbreviated terms

PII Personally identifiable information

5 Scenarios

5.1 Using multi-sourced data to reduce traffic deaths and injuries

Worldwide, 1,25 million people die each year from traffic-related accidents and between 20 million and 50 million people suffer injuries. Data sets include accident data, roadway attributes, land use, demographics, commuting patterns, parking violations and existing safety improvements. One of the key outcomes is an "exposure model" that predicts the number of cars in a given location at a given time. Actual measurements of traffic are very expensive while predictions using machine learning are relatively inexpensive.

For example, In the US, where 34,000 people die annually in traffic-related accidents, a non-profit organization, called DataKind®[1)] is using data and machine learning to develop models to predict traffic accident patterns. These patterns can then be used to determine where to focus street improvements and predict the effect on accident rates for specific improvements. Street improvements have included traffic signals and controls, bicycle lanes, road design and treatments.

DataKind® held a DATADIVE®[2)] to bring data scientists together to transform the available data and develop the model.

One of the key challenges in this scenario is getting data owners to entrust their data to a group and to a third-party processor. Specific concerns include:

— How are applicable regulations, policies and other data use restrictions identified and adhered to?

— How are privacy infringements avoided?

1) DataKind is the service mark of DataKind. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO or IEC.

2) DATADIVE is the service mark of a service supplied by DataKind. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO or IEC of the service named. Equivalent services may be used if they can be shown to lead to the same results.

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