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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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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Introduction

The ISO/IEC 20547 series is intended to provide users with a standardized approach to developing and implementing big data architectures and provide references for approaches. ISO/IEC TR 20547-1 provides users with an overview of the reference architecture framework described in this document and a process for applying that framework in developing an architecture. ISO/IEC TR 20547-2 provides a collection of big data use cases and decomposes those use cases into technical considerations that big data architects and system implementers can consider. This document describes the reference architecture in terms of User and Functional views. Those views can be used by the big data architect to describe their specific system. ISO/IEC 20547-4 describes the security and privacy aspects unique to big data. ISO/IEC TR 20547-5 provides a list of standards and their relationship to the reference architecture that architects and implementers can consider as part of the design and implementation of their system.

Each of these parts is built on the common vocabulary and concepts described in ISO/IEC 20546.

In general terms, reference architecture provides an authoritative source of information about a specific subject area that guides and constrains the instantiations of multiple architectures and solutions (see 3.2). Reference architectures generally serve as a reference foundation for solution architectures and can also be used for comparison and alignment purposes.

The key goal of this reference architecture is to facilitate a shared understanding across multiple products, organizations, and disciplines about current architectures and future direction.

The reference architecture presented in this document provides an architecture framework for describing the big data components, processes, and systems to establish a common language for the various stakeholders named as big data reference architecture (BDRA). It does not represent the system architecture of a specific big data system. Instead, it is a tool for describing, discussing, and developing system-specific architectures using an architecture framework of reference. It provides generic high-level architectural views that are an effective tool for discussing the requirements, structures, and operations inherent to big data. The model is not tied to any specific vendor products, services or reference implementation, nor does it define prescriptive solutions that inhibit innovation.

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Information technology — Big data reference architecture —

Part 3: Reference architecture

1 Scope

This document specifies the big data reference architecture (BDRA). The reference architecture includes concepts and architectural views.

The reference architecture specified in this document defines two architectural viewpoints:

— a user view defining roles/sub-roles, their relationships, and types of activities within a big data ecosystem;

— a functional view defining the architectural layers and the classes of functional components within those layers that implement the activities of the roles/sub-roles within the user view.

The BDRA is intended to:

— provide a common language for the various stakeholders;

— encourage adherence to common standards, specifications, and patterns;

— provide consistency of implementation of technology to solve similar problem sets;

— facilitate the understanding of the operational intricacies in big data;

— illustrate and understand the various big data components, processes, and systems, in the context of an overall big data conceptual model;

— provide a technical reference for government departments, agencies and other consumers to understand, discuss, categorize and compare big data solutions; and

— facilitate the analysis of candidate standards for interoperability, portability, reusability, and extendibility.

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 8000-2, *Data quality — Part 2: Vocabulary*

ISO/TS 8000-60, *Data quality — Part 60: Data quality management: Overview*

ISO 8000-61, *Data quality — Part 61: Data quality management: Process reference model*

ISO/IEC 38500, *Information technology — Governance of IT for the organization*

ISO/IEC 38505-1, *Information technology — Governance of IT — Governance of data — Part 1: Application of ISO/IEC 38500 to the governance of data*

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ISO/IEC TR 38505-2, *Information technology — Governance of IT — Governance of data — Part 2: Implications of ISO/IEC 38505-1 for data management*

ISO 55000, *Asset management — Overview, principles and terminology*

ISO 55001, *Asset management — Management systems — Requirements*

ISO 55002, *Asset management — Management systems — Guidelines for the application of ISO 55001*

ISO/IEC/IEEE 42010, *Systems and software engineering — Architecture description*

ISO/IEC 20546, *Information technology — Big data — Overview and vocabulary*

ISO/IEC 17789, *Information technology — Cloud computing — Reference architecture*

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