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Information technology — Big data — Overview and vocabulary

AS ISO/IEC 20546:2020

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Preface

This Standard was prepared by the Standards Australia Committee IT-043, Artificial Intelligence.

The objective of this document is to provides a set of terms and definitions needed to promote improved communication and understanding of this area. It provides a terminological foundation for big data-related standards.

This document provides a conceptual overview of the field of big data, its relationship to other technical areas and standards efforts, and the concepts ascribed to big data that are not new to big data.

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 42, *Artificial intelligence*.

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.This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology.*

Introduction

The big data paradigm is a rapidly changing field with rapidly changing technologies.

The term big data implies datasets that are extensive in volume, velocity, variety and/or variability. The term does not, however, represent data that is simply larger than before, since this has happened on a regular basis for decades. The specific occurrence that has led to the widespread usage of the term big data is that in the mid-2000s, extensive datasets could no longer be handled using extant data systems. The big data techniques represented a shift at that time to use distributed data management and processing through horizontal scaling to achieve the needed performance efficiency at an affordable cost.

In the evolution of data processing systems, there have been a number of times when the need for efficient, cost-effective data analysis has forced a change in existing technologies. For example, the move to a relational model occurred when methods to reliably handle changes to structured data led in the 1980s to the shift to relational databases that modelled relational algebra. That was a fundamental shift in data handling. The revolution in technologies referred to as big data has arisen because the relational model could no longer efficiently handle all the needs for analysis of large and often unstructured datasets. It is not just that data is larger than before, as data has been steadily getting larger for decades. The big data revolution is instead a one-time fundamental shift in architecture towards parallelization, just as the shift to the relational model was a one-time shift. As relational databases evolved to greater efficiencies over decades, so too will big data technologies continue to evolve. Many of the conceptual underpinnings of big data have been around for years, but the years since the mid-2000s have seen an explosion in scaling technologies and their maturation and application to scaled data systems.

The term big data is overloaded in common usage and is used to represent a number of related concepts, in part because several distinct system dimensions are consistently interacting with each other. To understand this revolution, the interplay of the following aspects needs to be considered: the data and processing characteristics of the datasets, the analysis of the datasets, the performance of the systems that handle the data, the business considerations of cost effectiveness, and the new engineering and analysis techniques for distributed data processing using horizontal scaling.

Annex A provides an overview of several concepts from the broader computing domain which are cross-cutting with respect to big data.

NOTES

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1 Scope

This document provides a set of terms and definitions needed to promote improved communication and understanding of this area. It provides a terminological foundation for big data-related standards.

This document provides a conceptual overview of the field of big data, its relationship to other technical areas and standards efforts, and the concepts ascribed to big data that are not new to big data.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

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

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

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

3.1 Terms and definitions

3.1.1
benefit
advantage to the organization of the actionable knowledge derived from an analytic system

Note 1 to entry: Benefit is often ascribed to big data due to the understanding that data has potential value that was typically not considered previously.

3.1.2
big data
extensive *datasets* (3.1.11) — primarily in the *data* (3.1.5) characteristics of volume, variety, velocity, and/or variability — that require a scalable technology for efficient storage, manipulation, management, and analysis

Note 1 to entry: Big data is commonly used in many different ways, for example as the name of the scalable technology used to handle big data extensive datasets.

3.1.3
cloud computing
paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with self-service provisioning and administration on-demand

Note 1 to entry: Examples of resources include servers, operating systems, networks, software, applications, and storage equipment.

[SOURCE: ISO/IEC 17788:2014, 3.2.5]

3.1.4
cluster
<distributed data processing> set of functional units under common control

[SOURCE: ISO/IEC 2382:2015, 2120586]