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Cloud computing — Service level agreement (SLA) framework —

Part 2: **Metric model**

Informatique en nuage — Cadre de travail de l'accord du niveau de service —

Partie 2: Modèle métrique

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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. 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 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).

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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.

This document was prepared by Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC 38, *Cloud Computing and Distributed Platforms*.

A list of all parts in the ISO 19086 series can be found on the ISO website.

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

The measurement of properties of cloud services, especially for the purpose of cloud service level agreements (SLAs), presents many challenges, which inhibit the uptake of cloud services and inhibit the overall effectiveness of the cloud services marketplace. Metrics in practice are usually described using natural languages, typically in 'plain English', which is often difficult to understand, compare, and implement. Such definitions of metrics lead to many problems. Typical concerns include:

— **Clarity:** The metric definition may be incomplete, ambiguous, illogical, self-contradictory, or not defined at all. For example, cases exist where 'availability' is defined in ways which have little to do with generally accepted definitions of 'availability'; where the definition is such that the service can be unavailable for the majority of the time yet the metric will show 100 % availability; where the metric requires continuous monitoring, which is actually not possible; or where the provider is able to determine at its sole discretion what the result is.

— **Comparability:** It may be impractical or effectively impossible to compare different services in terms of their promised service levels because of the significant inconsistency in how their respective metrics and SLOs/SQOs are defined.

— **Implementation:** It may be impractical or even impossible to measure the metric in practice, and to determine whether promised service levels have been met or not.

This document has been developed to help address these and similar concerns. It includes technical content, but the high-level concepts are expected to be understandable by non-technical individuals who understand the business context for metrics. It provides a metric model that defines the conditions and rules for performing a measurement and understanding the result.

A metric complying with the model defined by this document addresses the concerns above:

— **Clarity:** A definition of a metric eliminates the ambiguities which currently exist in natural language descriptions.

— **Comparability:** The structured nature of the metric facilitates the comparison of different metrics and SLOs/SQOs based on a metric.

— **Implementation:** The structured representation of the information needed to measure a characteristic facilitates the process of developing measurement tools. Likewise, if the metric is found not to be implementable, then the metric will need to be revised so that it can be implemented, and the structure of the technical specification is expected to facilitate this revision process.

The focus of this document is on metrics for cloud SLAs, but it is also usable for cloud service metrics (CSMs) that are not included in cloud SLAs [such as ones used by cloud service providers (CSPs) for their internal performance monitoring], and may also be usable for non-CSMs.

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Cloud computing — Service level agreement (SLA) framework —

Part 2: Metric model

1 Scope

This document establishes common terminology, defines a model for specifying metrics for cloud SLAs, and includes applications of the model with examples. This document establishes a common terminology and approach for specifying metrics.

This document is for the benefit of and use for both cloud service providers (CSPs) and cloud service customers (CSCs). This document is intended to complement ISO/IEC 19086-1, ISO/IEC 19086-3 and ISO/IEC 19086-4.

This document does not mandate the use of a specific set of metrics for cloud SLAs.

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, | ITU-T Y.3500, *Information technology — Cloud computing — Overview and vocabulary*

ISO/IEC 19086-1, *Information technology — Cloud computing — Service level agreement (SLA) framework — Part 1: Overview and concepts*

W3C Recommendation 28 October 2004. *XML Schema Part 1: Structures Second Edition*. http://www.w3.org/TR/xmlschema-1/

W3C Recommendation 28 October 2004. *XML Schema Part 2: Datatypes Second Edition*. http://www.w3.org/TR/xmlschema-2/

3 Terms and definitions

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

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

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

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

3.1
cloud service characteristic
qualitative or quantitative property of a cloud service

3.2
cloud service metric
metric (3.6) used to assess a *cloud service characteristic* (3.1)

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3.3
cloud service objective
SO
commitment a cloud service provider (CSP) makes for a specific characteristic of a cloud service

Note 1 to entry: The set of SOs is the union of the set of cloud service level objectives (SLOs) and the set of cloud service qualitative objectives (SQOs).

3.4
measurement
set of operations having the objective of determining a *measurement result* (3.5)

Note 1 to entry: Based on the definition of measurement in ISO/IEC/IEEE 15939:2017. Also used here to describe an actual instance of execution of these operations leading to the production of a measurement result instance.

3.5
measurement result
value that expresses a qualitative or quantitative assessment of a *cloud service characteristic* (3.1)

3.6
metric
standard of measurement that defines the conditions and the rules for performing the *measurement* (3.4) and for understanding the *measurement result* (3.5)

Note 1 to entry: The metric describes what the result of the measurement means, but not how the measurement implements the metric.

Note 2 to entry: A metric is to be applied in practice within a given context that requires specific properties to be measured, at a given time(s) for a specific objective.

Note 3 to entry: The metrics model proposed in this document supports the definition of composite metrics, which can be defined in terms of one or more underlying (reusable) metrics.

[SOURCE: ISO/IEC 19086-1:2016, 3.10, modified — Notes to entry have been modified.]

3.7
unit
real scalar quantity, defined and adopted by convention, with which any other quantity of the same kind can be compared to express the ratio of the second quantity to the first one as a number

[SOURCE: ISO/IEC 80000-1:2009, modified — NOTES 1 to 5 have not been included.]

4 Symbols and abbreviated terms

CSA	Cloud Service Agreement
CSC	Cloud Service Customer
CSM	Cloud Service Metric
CSP	Cloud Service Provider
PII	Personally Identifiable Information
SLA	Service Level Agreement
SLO	Cloud Service Level Objective
SO	Cloud Service Objective
SQO	Cloud Service Qualitative Objective

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