



BSI Standards Publication

**Information technology — Cloud computing —
Guidance for using the cloud SLA metric model**

National foreword

This Published Document is the UK implementation of ISO/IEC TR 23951:2020.

The UK participation in its preparation was entrusted to Technical Committee IST/38, Cloud Computing and Distributed Platforms.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 539 14513 7

ICS 35.210

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 July 2020.

Amendments/corrigenda issued since publication

| Date | Text affected |
|------|---------------|
|------|---------------|

**Information technology — Cloud
computing — Guidance for using the
cloud SLA metric model**

*Technologies de l'information — Informatique en nuage —
Recommandations pour l'utilisation du modèle métrique d'accord de
niveau de service (SLA) dans le Cloud*





ALL RIGHTS RESERVED

© ISO/IEC 2020

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

Contents

| | Page |
|---|-----------|
| Foreword | v |
| Introduction | vi |
| 1 Scope | 1 |
| 2 Normative references | 1 |
| 3 Terms and definitions | 1 |
| 4 Symbols and abbreviated terms | 1 |
| 5 Structure of this document | 2 |
| 6 Motivation | 2 |
| 6.1 Preamble..... | 2 |
| 6.2 Audience and some user categories..... | 2 |
| 6.2.1 General..... | 2 |
| 6.2.2 Cloud service customer (CSC)..... | 3 |
| 6.2.3 Cloud service provider (CSP)..... | 3 |
| 6.2.4 Cloud service partner (CSN)..... | 3 |
| 6.2.5 Regulators and policy makers..... | 4 |
| 6.3 Usage patterns..... | 4 |
| 6.3.1 General..... | 4 |
| 6.3.2 Extract and clarify an existing metric description from an SLA..... | 4 |
| 6.3.3 Create and share a metric description..... | 4 |
| 6.3.4 Compare metric descriptions..... | 5 |
| 6.3.5 Share a common foundation for a set of metrics..... | 5 |
| 6.3.6 Build a metrics catalogue..... | 5 |
| 6.4 Examples of scenarios and roles involved in sharing metric definitions..... | 5 |
| 7 The metric model in practice: templates | 6 |
| 7.1 A brief reminder of the metric model..... | 6 |
| 7.2 A tabular representation..... | 7 |
| 7.2.1 General..... | 7 |
| 7.2.2 The tabular representation for the Metric element..... | 8 |
| 7.2.3 The tabular representation for the Expression elements..... | 9 |
| 7.2.4 The tabular representation for the Rule elements..... | 10 |
| 7.2.5 The tabular representation for the Parameter elements..... | 11 |
| 8 An example of metric definition: the cloud service mean response time metric | 11 |
| 8.1 The cloud service mean response time metric: informal variant..... | 11 |
| 8.1.1 Extracting metric elements from an SLA narrative..... | 11 |
| 8.1.2 Using the tabular representation..... | 12 |
| 8.1.3 Overall structure of the metric..... | 14 |
| 8.2 The cloud service mean response time metric: more formal variant..... | 14 |
| 8.2.1 A more formal variant of the metric..... | 14 |
| 8.2.2 Adding a parameter..... | 15 |
| 8.2.3 The metric rules..... | 15 |
| 8.2.4 The metric expressions..... | 15 |
| 8.2.5 Overall structure of the metric..... | 17 |
| 8.2.6 Using constants..... | 17 |
| 9 Guidelines for using the metric model with the tabular representation | 19 |
| 9.1 General..... | 19 |
| 9.2 Guideline 1 about defining expression and rule languages..... | 20 |
| 9.3 Guideline 2 about associating rules with expressions..... | 20 |
| 9.4 Guideline 3 about relating expressions to each other..... | 20 |
| 9.5 Guideline 4 about the identifiers of metric elements..... | 21 |
| 9.6 Guideline 5 about rules specifically designed to support an expression..... | 21 |
| 9.7 Guideline 6 about the role of parameters..... | 21 |

| | | |
|-----------|---|-----------|
| 9.8 | Guideline 7 about representing constants | 22 |
| 10 | The simple cloud service availability metric | 22 |
| 10.1 | Measuring cloud service availability | 22 |
| 10.1.1 | General | 22 |
| 10.1.2 | Overall design approach | 23 |
| 10.1.3 | SLA rules and metric rules | 23 |
| 10.2 | The simple cloud service availability metric variant Simple_SAM_1 | 24 |
| 10.2.1 | The Metric element | 24 |
| 10.2.2 | The metric rules | 24 |
| 10.2.3 | The metric expressions | 25 |
| 10.2.4 | The metric parameters | 27 |
| 10.2.5 | Overall structure of the metric | 27 |
| 10.3 | The simple cloud service availability metric variant Simple_SAM_2 | 28 |
| 10.3.1 | Differences in metric design and assumptions | 28 |
| 10.3.2 | The Metric element | 29 |
| 10.3.3 | The metric rules | 29 |
| 10.3.4 | The metric parameters | 30 |
| 10.3.5 | The metric expressions | 31 |
| 10.3.6 | Overall structure of the metric | 32 |
| 10.3.7 | An alternative metric design using the Configuration element option | 32 |
| | Bibliography | 34 |

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

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 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.

Introduction

In most cases, cloud service providers (CSPs) and cloud service customers (CSCs) negotiate service level agreements (SLAs) which include service level objectives (SLOs) and service qualitative objectives (SQOs) for which CSPs make commitments. The commitments described in SLAs are expected to be measured against actual performance of the service to ensure compliance with the SLA. How actual performance compares against commitments in SLAs is explained in ISO/IEC 19086-2. Cloud SLAs are covered in ISO/IEC 19086-1 and in ISO/IEC 19086-4.

The metric model in ISO/IEC 19086-2 establishes common terminology, defines a model for specifying metrics for cloud SLAs, and includes applications of the model with examples. This document provides guidance and examples on using the metric model to compose the calculation of a cloud service performance measure in order to compare against an SLA commitment. A few examples from the SLOs listed in ISO/IEC 19086-1:2016, Clause 10 are given in the document, such as Cloud Service Mean Response Time and Simple Cloud Service Availability. As specific, measurable characteristics of a cloud service, SLOs are the basis for defining the metrics used to evaluate and compare agreements between parties.

In [Clauses 8, 9](#) and [10](#) of this document, a basic explanation of these examples is provided using a practical method based on a tabular format that is a refinement of the informative tables provided in ISO/IEC 19086-2:2018, Annex B. The tabular representation described in this document serves as templates for designing metrics. Guidance in using the metric model with these templates is provided while developing metric examples.

Information technology — Cloud computing — Guidance for using the cloud SLA metric model

1 Scope

The scope of this document is to describe guidance for using the ISO/IEC 19086-2 metric model, illustrated with examples.

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*

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

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

ISO/IEC 19086-2, *Cloud computing — Service level agreement (SLA) framework — Part 2: Metric model*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 17788, ISO/IEC 17789, ISO/IEC 19086-1 and ISO/IEC 19086-2 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/>

4 Symbols and abbreviated terms

| | |
|------|--|
| CCRA | cloud computing reference architecture |
| CSC | cloud service customer |
| CSN | cloud service partner |
| CSP | cloud service provider |
| SLA | service level agreement |
| SLO | service level objective |
| SQO | service quality objective |