INTERNATIONAL STANDARD

ISO/IEC 19086-1

First edition
2016-09-15

Information technology — Cloud computing — Service level agreement (SLA) framework —

Part 1: Overview and concepts

Technologies de l'information — Informatique en nuage — Cadre de travail de l'accord du niveau de service —
Partie 1: Aperçu général et concepts

Reference number
ISO/IEC 19086-1:2016(E)

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

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).

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 38, *Cloud computing and distributed platforms*.

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

Introduction

This document provides an overview, foundational concepts, and definitions for the cloud SLA framework. ISO/IEC 19086 builds on the cloud computing concepts defined in ISO/IEC 17788 and ISO/IEC 17789. This document establishes a common framework for helping organizations to understand the purpose of all the parts of ISO/IEC 19086 and the relationships between those parts. It also identifies other documents that have relationships with ISO/IEC 19086 and which are useful in understanding cloud SLAs.

This document can be used by any organization or individual involved in the creation, modification or understanding of a cloud service level agreement which conforms to ISO/IEC 19086. The cloud SLA should account for the key characteristics of a cloud computing service and needs to facilitate a common understanding between cloud service providers and cloud service customers.

In particular, it defines the following fundamental concepts of the cloud SLA framework:

— Cloud Service Agreement (CSA)

— Cloud Service Level Agreement (SLA)

— Cloud Service Level Objectives (SLO)

— Cloud Service Qualitative Objectives (SQO)

This document also describes the content areas and components that consist of a list of SLOs and SQOs.

— ISO/IEC 19086-2 provides the metrics model to be used for creating metrics used in SLOs and SQOs.

— ISO/IEC 19086-3 provides the core conformance requirements derived from the SLOs and SQOs defined in this document.

— ISO/IEC 19086-4 builds upon the foundational concepts and definitions described by this document by describing specific components and the conformance requirements for SLOs and SQOs in the area of Security and Privacy.

More specifically, this document

a) promotes cohesion between the parts of ISO/IEC 19086 by explaining the concepts and terminology used across all parts,

b) contributes to the understanding of ISO/IEC 19086 by clarifying the relationships between all the parts, and

c) provides an overview of other International Standards which can be used in combination with ISO/IEC 19086.

Figure 1 represents an overview of the content of ISO/IEC 19086 and the relationships between the parts of ISO/IEC 19086 and other key International Standards relating to cloud computing.

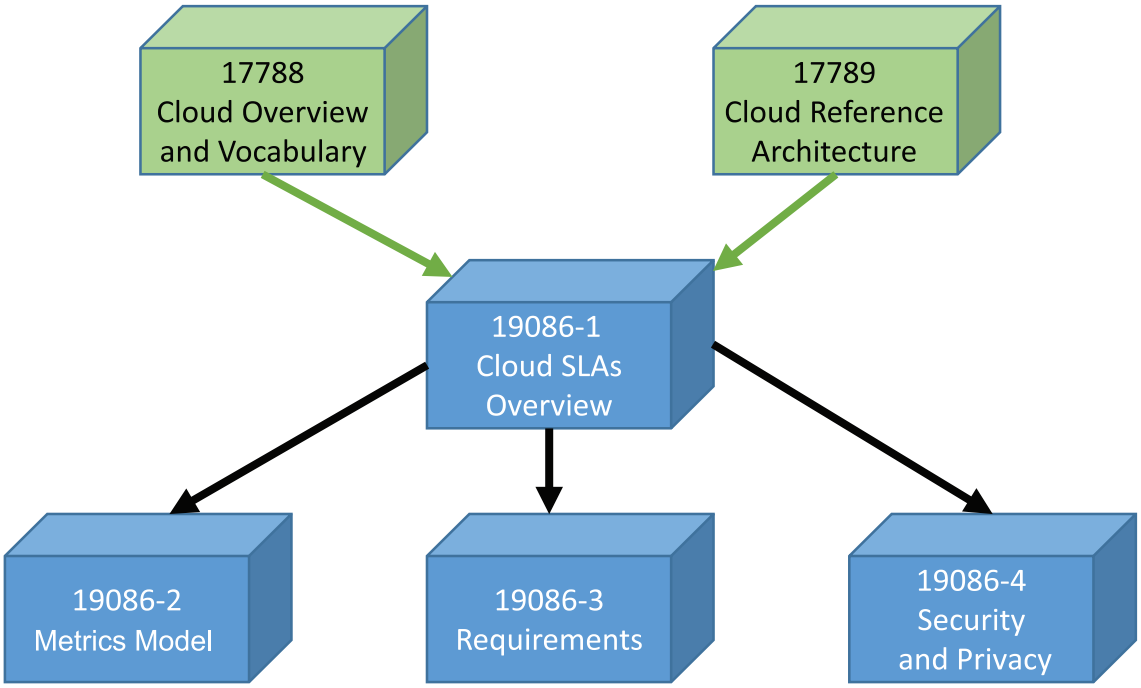

Figure 1 — Relationship of parts of ISO/IEC 19086 and other cloud computing standards

This document addresses the contents of a cloud SLA in two main groupings: SLA Components, addressed in Clause 9, and SLA Content Areas, addressed in Clause 10, as shown in Figure 2.

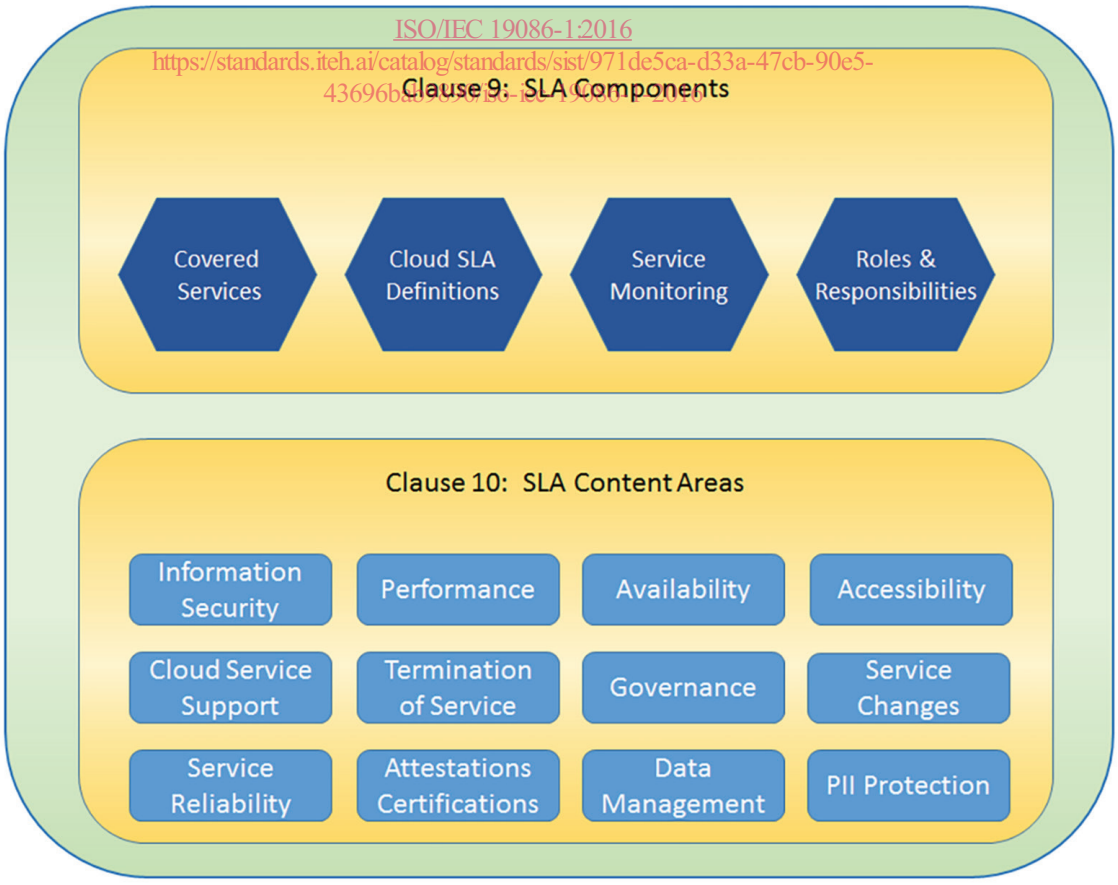

Figure 2 — SLA components and SLA content areas

Information technology — Cloud computing — Service level agreement (SLA) framework —

Part 1: Overview and concepts

1 Scope

This document seeks to establish a set of common cloud SLA building blocks (concepts, terms, definitions, contexts) that can be used to create cloud Service Level Agreements (SLAs).

This document specifies

a) an overview of cloud SLAs,

b) identification of the relationship between the cloud service agreement and the cloud SLA,

c) concepts that can be used to build cloud SLAs, and

d) terms commonly used in cloud SLAs.

This document is for the benefit and use of both cloud service providers and cloud service customers. The aim is to avoid confusion and facilitate a common understanding between cloud service providers and cloud service customers. Cloud service agreements and their associated cloud SLAs vary between cloud service providers, and in some cases different cloud service customers can negotiate different contract terms with the same cloud service provider for the same cloud service. This document aims to assist cloud service customers when they compare cloud services from different cloud service providers.

This document does not provide a standard structure that can be used for a cloud SLA or a standard set of cloud service level objectives (SLOs) and cloud service qualitative objectives (SQOs) that will apply to all cloud services or all cloud service providers. This approach provides flexibility for cloud service providers in tailoring their cloud SLAs to the particular characteristics of the offered cloud services.

This document does not supersede any legal requirement.

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 17788:2014, *Information technology — Cloud computing — Overview and vocabulary*

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

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:

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

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

3.1
accessibility
usability of a product, service, environment or facility by people within the widest range of capabilities

Note 1 to entry: The concept of accessibility addresses the full range of user capabilities and is not limited to users who are formally recognized as having disability.

Note 2 to entry: The usability-oriented concept of accessibility aims to achieve levels of effectiveness, efficiency and satisfaction that are as high as possible considering the specified context of use, while paying attention to the full range of capabilities within the user population.

Note 3 to entry: It is important in the context of ISO/IEC 19086 to distinguish between the specialized meaning of "accessibility" as defined here and the term "accessible" which is used with its dictionary meaning of "able to be reached or entered."

[SOURCE: ISO 9241-171:2008, 3.2]

3.2
business continuity
capability of the organization to continue delivery of products or services at acceptable predefined levels following disruptive incident

[SOURCE: ISO/IEC 22301:2012, 3.3]

3.3
cloud service agreement
documented agreement between the cloud service provider and cloud service customer that governs the covered service(s)

Note 1 to entry: A cloud service agreement can consist of one or more parts recorded in one or more documents.

3.4
cloud service level agreement
cloud SLA
part of the cloud service agreement (3.3) that includes cloud service level objectives (3.5) and cloud service qualitative objectives (3.6) for the covered cloud service(s)

3.5
cloud service level objective
SLO
commitment a cloud service provider makes for a specific, quantitative characteristic of a cloud service, where the value follows the interval scale (3.9) or ratio scale (3.17)

Note 1 to entry: An SLO commitment may be expressed as a range.

3.6
cloud service qualitative objective
SQO
commitment a cloud service provider makes for a specific, qualitative characteristic of a cloud service, where the value follows the *nominal scale* (3.11) or *ordinal scale* (3.12)

Note 1 to entry: A cloud service qualitative objective may be expressed as an enumerated list.

Note 2 to entry: Qualitative characteristics typically require human interpretation.

Note 3 to entry: The ordinal scale allows for existence/non-existence.

3.7
disaster recovery
ability of the ICT elements of an organization to support its critical business functions to an acceptable level within a predetermined period of time following a disaster

[SOURCE: ISO/IEC 27031:2011, 3.7]

3.8
failure notification policy
policy specifying the processes by which the cloud service customer and cloud service partner can notify the cloud service provider of a service outage and by which the cloud service provider can notify the cloud service customer and cloud service partner that a service outage has occurred.

Note 1 to entry: The policy may also include the process for providing updates on service outages, who receives notifications and updates, the maximum time between the detection of a service outage and the issuance of a notice of service outage, the maximum time interval between service outage updates and how service outage updates are described.

3.9
interval scale
continuous scale or discrete scale with equal sized scale values and an arbitrary zero

[SOURCE: ISO 3534-2:2006, 1.1.8]

3.10
metric
standard of measurement that defines the conditions and the rules for performing the measurement and for understanding the results of a measurement

Note 1 to entry: A metric implements a particular abstract metric concept.

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 goal.

3.11
nominal scale
scale with unordered labelled categories or ordered by convention

[SOURCE: ISO 3534-2:2006, 1.1.6]

3.12
ordinal scale
scale with ordered labelled categories

[SOURCE: ISO 3534-2:2006, 1.1.7]

3.13
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

Note 1 to entry: To determine whether a PII principal is identifiable, account should be taken of all the means which can reasonably be used by the privacy stakeholder holding the data, or by any other party, to identify that natural person.

[SOURCE: ISO/IEC 29100:2011, 2.9]

3.14
PII controller
privacy stakeholder (or privacy stakeholders) that determines the purposes and means for processing personally identifiable information (PII) other than natural persons who use data for personal purposes

[SOURCE: ISO/IEC 29100:2011, 2.10]

3.15
PII principal
natural person to whom the personally identifiable information (PII) relates

[SOURCE: ISO/IEC 29100:2011, 2.11]

3.16
PII processor
privacy stakeholder that processes personally identifiable information (PII) on behalf of and in accordance with the instructions of a PII controller

[SOURCE: ISO/IEC 29100:2011, 2.12]

3.17
ratio scale
continuous scale with equal sized scale values and an absolute or natural zero point

[SOURCE: ISO 3534-2:2006, 1.1.9]

3.18
remedy
compensation available to the cloud service customer in the event the cloud service provider fails to meet a specified cloud service level objective (3.5)

Note 1 to entry: This definition of the term in English is based on the "legal reparation" meaning defined in The Shorter Oxford English Dictionary.

3.19
resilience
ability of a cloud service to recover operational condition quickly after a fault occurs

4 Symbols and abbreviated terms

BLOB	Binary Large Object
CSA	Cloud Service Agreement
CSC	Cloud Service Customer
CSP	Cloud Service Provider
ICT	Information and Communications Technology
IPR	Intellectual Property Rights
IT	Information Technology
PII	Personally Identifiable Information
RPO	Recovery Point Objective
RTO	Recovery Time Objective

SLA Service Level Agreement

SLO Cloud Service Level Objective

SQO Cloud Service Qualitative Objective

VM Virtual Machine

5 Overview of SLAs for cloud services

A cloud service level agreement (cloud SLA) is a part of the cloud service agreement that includes cloud service level objectives and cloud service qualitative objectives for the covered cloud service(s). The cloud SLA should account for the key characteristics of cloud computing as described in ISO/IEC 17788:2014, 6.2 that include the following.

— **On-demand self-service** — A CSC may gain access to cloud services without human interaction with the CSP. The cloud service agreement (CSA) (see Clause 6) and the associated cloud SLA may be presented and agreed through software tools and financial arrangements that are automated.

— **Resource pooling** — The public cloud deployment models allow sharing resources across many CSCs that do not have a relationship. The private cloud models allow users to share resources within the same organization. The hybrid cloud models allow users to share some resources within the same organization and some resources across many CSCs that do not necessarily have a relationship with one another. The community cloud deployment models allow sharing resources across CSCs that have some relationship.

— **Multi-tenancy** — Cloud environments are enabled through the use of large-scale virtualization of servers, storage and networks. Overall system usage is typically spread over many CSCs. Multi-tenancy allows sharing of resources in such a way that multiple tenants and their computations and data are isolated from and inaccessible to one another. Cloud environments typically have no persistent relationship between particular physical resources and their use by CSCs. The CSCs are assigned virtual resources, and logging of usage is done at this level of abstraction.

— **Rapid elasticity and scalability** — A characteristic of cloud computing where physical or virtual resources can be rapidly and elastically adjusted, in some cases automatically, to quickly increase or decrease resources.

— **Tradeoff between cost and control** — Large-scale, standardized cloud services may be provided on a low unit cost, utility basis, in conjunction with standardized contracts and cloud SLAs. If a CSC requires more control and customization of cloud services than is available from a standard utility service model, then this may be provided at an additional cost and with a specific cloud SLA.

— **Measured service** — A feature where the metered delivery of cloud services is such that usage can be monitored, controlled, reported and billed. This is an important feature needed to optimize and validate the delivered cloud service. The focus of this key characteristic is that the CSC may only pay for the resources that they use.

— **Broad network access** — The capabilities of cloud services are made available over the network and are typically accessed through standard mechanisms that promote use by heterogeneous client platforms (for example, access through mobile phones, laptops and workstations).

Details of cloud SLAs, SLOs and SQOs can vary for different cloud service categories, cloud capabilities types and different cloud deployment models (see ISO/IEC 17788). Cloud SLAs in this document are intended to be useful for CSCs and CSPs across the variety of cloud service categories and cloud deployment models. As the definitions of SLOs and SQOs are intended to be technology and business model neutral, so not all of these SLOs or SQOs will apply to every cloud service, and those that do apply may be structured and applied in different ways to specific cloud services. For example, service availability can be measured in different ways, some of which depend on the specific cloud service: a