TECHNICAL REPORT

ISO/IEC TR 23613

First edition
2020-05

Information technology — Cloud computing — Cloud service metering elements and billing modes

Reference number
ISO/IEC TR 23613:2020(E)

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

Published in Switzerland

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.

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

As the adoption of cloud computing expands and the market grows, cloud service providers (CSPs) offer many different cloud services that can be classified as infrastructure, platform or application capabilities types. CSPs, in designing solutions to meet the needs of cloud service customers (CSCs), put together diverse metering elements and billing modes that complement the cloud services offered to cloud service customers (CSCs). It is challenging for CSCs to determine the differences among many diverse metering elements and billing modes from various CSPs as they navigate their journey to adopt cloud computing.

Measured service is one of the key characteristics of cloud computing (ISO/IEC 17788). The characteristic is that usage is monitored, controlled, reported, and billed for the delivered cloud service. To this end, it is necessary that usage can be monitored, controlled, reported, and billed for the delivered cloud service. Metering elements can be classified according to its cloud capabilities type. Transparent and scientific metering and billing results can be easily achieved if common operation practices apply.

The purpose of this document is to provide basic clarity and guidance through a sample set of cloud service metering elements and billing modes for different cloud capabilities types. Clause 5 includes a discussion of the billing functional component, of which metering is a major sub-component. Clause 6 introduces a sample set of metering elements. These examples can help a CSP better describe its billing and metering practices and can help CSCs to better understand the metering and billing of their cloud services in order to make informed decisions. Clause 7 explores some baseline guidance on cloud service metering and billing.

Information technology — Cloud computing — Cloud service metering elements and billing modes

1 Scope

This document describes a sample set of cloud service metering elements and billing modes.

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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 17788, ISO/IEC 17789 and the following 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
metering unit
unit of measure for a *metering element* (3.2)

3.2
metering element
characteristic of a cloud service that is subject to being metered

4 Abbreviated terms

API	Application Programming Interface
CSP	Cloud Service Provider
CSC	Cloud Service Customer
CPU	Central Processing Unit
IOPS	Input/Output Operations Per Second
IP	Internet Protocol
QoS	Quality of Service
SLA	Service Level Agreement

5 Cloud service metering and billing concepts

According to ISO/IEC 17789, the billing functional component contains metering, rating, pricing schedules and invoicing, as shown in Figure 1.

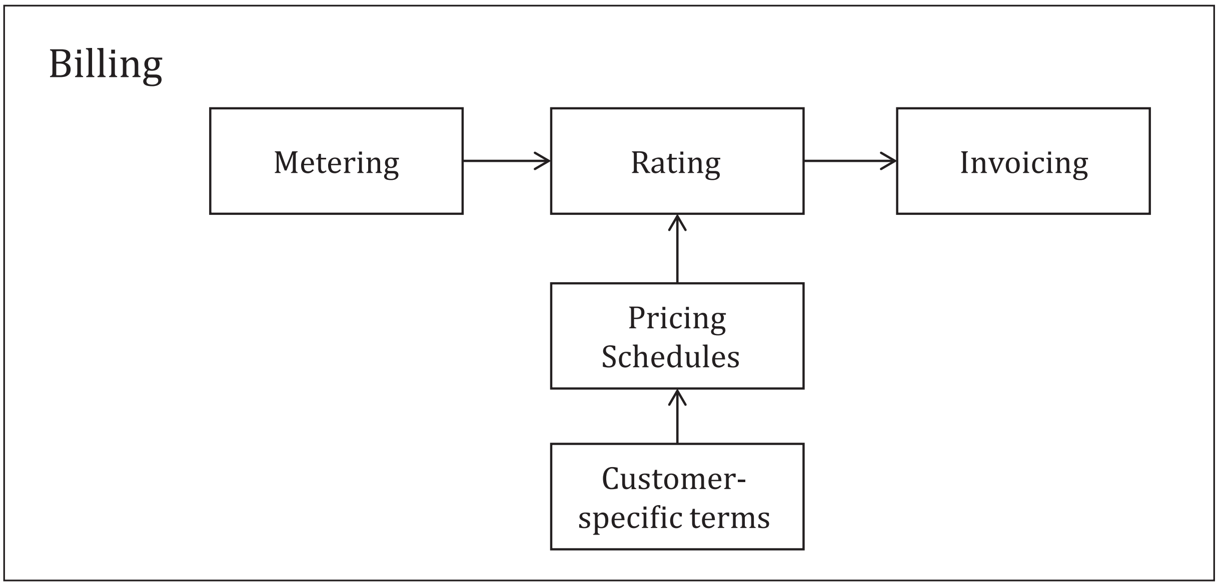

Figure 1 — Cloud service metering and billing concepts

Generally, there are two fundamental billing modes: billing by subscription and billing by usage. Billing by subscription means billing according to contractual indicators within typically periodic time boundaries, while billing by usage means billing according to actual usage of the cloud service, often within a given time period for calculating the fees. In practice, these two modes can be used separately or combined. For example, a subscription mode applies until reaching the upper boundary for monthly usage; above that, usage mode applies.

Metering is the measurement of the consumption of cloud services by each CSC. Rating is the application of pricing schedules to the metering data. The form of the metering data depends on the nature of the cloud service. The pricing schedules can involve customer-specific terms (e.g. discounts) and can require algorithmic application against the metering data.

The generation of invoices is based on the charges for the use of cloud services created by the metering and rating function or generated from subscription data. Invoices are transmitted by the CSP to the CSC.

6 Metering elements

6.1 Cloud service metering elements for infrastructure capabilities type

Infrastructure capabilities types include the provision and use of:

— processing resources,

— storage resources, or

— networking resources.

These resources are provided individually or in combination by a particular cloud service.

Processing resources can be offered in the form of:

— bare metal machine,

— virtual machine (VM), or

— container.

Storage resources can be offered in the form of:

— file storage service,

— object storage service, or

— block storage service.

Network resources can be offered in the form of:

— cloud access networking, or

— intra-cloud networking.

These resources are described in detail in ISO/IEC TS 23167.

Table 1 provides examples of metering elements that apply to infrastructure capabilities type.

The Table 1 "Service classification" rows and associated "Metering element"s are examples from today's cloud computing marketplace. It is possible that they will evolve with changes in technology and market opportunities.

Table 1 — A sample set of infrastructure capabilities type cloud service metering elements

Service classification	Metering element	Description	Metering unit
Virtual machine	CPU core count	Number of CPU cores assigned to each virtual machine instance.	N/A*
	Memory capacity	Main memory size for each virtual machine instance.	Byte
	Storage capacity	Persistent data storage size for each virtual machine instance.	Byte
	Operating time	Total running time of each virtual machine instance.	Second
VM Image	VM image size	Each VM image size.	Byte
	Keep-live time	The time the CSP keeps the given VM image at active storage. Beyond this time limit, the VM image can be archived on tape or other longer-term storage medium.	Second
Storage	Storage capacity	Total storage size.	Byte
	Storage IOPS	Rate of input/output operations.	Operations/second
	Throughput rate	Amount of data transferred per unit time.	Byte/second
Snapshot	Snapshot size	Snapshot is a real-time capture of a running VM current status, configuration, etc., as a file in the host machine. It can be used as a checkpoint for VM recovery. Snapshot size refers to the size of the file.	Byte