International Standard

ISO/IEC 23167

Information technology — Cloud computing — Common technologies and techniques

First edition
2026-07

Reference number
ISO/IEC 23167:2026(en)

© ISO/IEC 2026



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2026

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 **4**
5 Overview of common technologies and techniques used in cloud computing **5**
5.1 General 5
5.2 Technologies 5
5.2.1 General 5
5.2.2 Infrastructure capabilities type of cloud services 5
5.2.3 Platform capabilities of cloud services 6
5.2.4 Application capabilities type of cloud services 6
5.3 Techniques 6
6 Virtual machines and hypervisors **6**
6.1 General 6
6.2 Virtual machines and system virtualization 7
6.3 Hypervisors 7
6.3.1 General 7
6.3.2 Type I hypervisors 8
6.3.3 Type II hypervisors 8
6.4 Security of VMs and hypervisors 8
6.5 VM images, metadata and formats 9
7 Containers and container management systems (CMSs) **10**
7.1 General 10
7.2 Containers and operating system virtualization 10
7.2.1 Description of containers 10
7.2.2 Container daemon 11
7.2.3 Container resources, isolation and control 12
7.3 Container images and filesystem layering 13
7.3.1 Image purpose and content 13
7.3.2 Filesystem layering 14
7.3.3 Container image repositories and registries 15
7.4 Container management systems (CMSs) 15
7.4.1 General 15
7.4.2 Common CMS capabilities 16
8 Serverless computing **17**
8.1 General 17
8.2 Functions as a service 18
8.2.1 Overview 18
8.2.2 Functions within FaaS 18
8.2.3 Serverless frameworks 19
8.2.4 FaaS relationship to microservices and containers 19
8.3 Serverless databases 20
9 Microservices architecture **20**
9.1 General 20
9.2 Advantages and challenges of microservices 21
9.3 Specification of microservices 23
9.4 Multi-layered architecture 23
9.5 Service mesh 25
9.6 Circuit breaker 27

© ISO/IEC 2026 – All rights reserved

9.7 API gateway ... 27
10 Automation ... 28
10.1 General ... 28
10.2 Automation of the development lifecycle ... 28
10.3 Tooling for automation ... 28
11 Architecture of PaaS systems ... 29
11.1 General ... 29
11.2 Relationship with ISO/IEC TS 7339:2024 ... 30
11.3 Characteristics of PaaS systems ... 30
11.4 Architecture of components running under PaaS system ... 32
12 Data storage as a service ... 34
12.1 General ... 34
12.2 Common features of DSaaS ... 34
12.3 Capabilities type of DSaaS ... 38
12.4 Significant additional capabilities of DSaaS ... 39
13 Networking in cloud computing ... 39
13.1 Key aspects of networking ... 39
13.2 Cloud access networking ... 40
13.3 Intra-cloud networking ... 40
13.4 Virtual private networks (VPNs) and cloud computing ... 41
14 Cloud computing scalability ... 43
14.1 Scalability approaches ... 43
14.2 Parallel instances and load balancing ... 44
14.3 Elasticity and automation ... 44
14.4 Database scaling ... 44
15 Security and the cloud common technologies ... 45
15.1 General ... 45
15.2 Firewalls ... 45
15.3 Endpoint protection ... 46
15.4 Identity and access management (IAM) ... 46
15.5 Data encryption ... 46
15.6 Encryption key management ... 46
Bibliography ... 48

© ISO/IEC 2026 – All rights reserved

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 or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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. In the IEC, see www.iec.ch/understanding-standards.

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 and www.iec.ch/national-committees.

© ISO/IEC 2026 – All rights reserved

Introduction

Cloud computing is described at a high, conceptual level in the foundational standards ISO/IEC 22123-1, ISO/IEC 22123-2[1] and ISO/IEC 22123-3[2].

However, as the use of cloud computing has developed, a set of commonly used technologies has emerged to support, simplify and extend the use of cloud computing alongside sets of commonly used techniques which enable the effective exploitation of the capabilities of cloud services. Many of these common technologies and techniques are aimed at developers and operations staff, increasingly linked together in a unified approach called DevOps (see 10.2). The aim is to speed and simplify the creation and operation of solutions based on the use of cloud services.

This document describes common technologies and techniques in cloud computing and their relationships. It also specifies how these are applied by roles associated with cloud computing.

This document addresses areas that are still developing in the industry and will be of primary interest to service developers in cloud service providers.

© ISO/IEC 2026 – All rights reserved

Information technology — Cloud computing — Common technologies and techniques

1 Scope

This document provides a description of a set of common technologies and techniques used in conjunction with cloud computing. These include:

— virtual machines (VMs) and hypervisors;

— containers and container management systems (CMSs);

— serverless computing;

— microservices architecture;

— automation;

— platform as a service systems and architecture;

— storage services;

— security, scalability and networking as applied to the above cloud computing technologies.

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 TS 5928, *Information technology — Cloud computing and distributed platforms — Taxonomy for digital platforms*

ISO/IEC TS 7339:2024, *Information technology — Cloud computing — Overview of platform capabilities type and platform as a service*

ISO/IEC 22123-1:2023, *Information technology — Cloud computing — Part 1: Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 22123-1, ISO/IEC TS 5928, ISO/IEC TS 7339 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 https://www.electropedia.org/

3.1
guest operating system
guest OS
operating system that runs within a virtual machine

[SOURCE: ISO/IEC 21878:2018, 3.2]

© ISO/IEC 2026 – All rights reserved