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Information technology — Cloud computing and distributed platforms — Taxonomy for digital platforms

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Foreword

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Introduction

Technologies such as cloud computing are supporting the evolution of digital business and accelerating the shift to living and working (in part) online, in ways that would have been impossible a few years ago.

Increased debate about socio-technical developments always runs the risk of multi-disciplinary terminological confusion, due to the potential for the same word to be used for two or more distinct concepts. Moreover, polysemy (the capacity for a word or phrase to have multiple related meanings) is an attribute of many words. Any attempt to provide a single definition for a polysemic word needs to be sufficiently broad to account for all potential meanings.

Terms with alternative meanings in economic, societal, political, regulatory and technical contexts are being labelled with the same or similar names.

Adding clarity on concepts and definitions can assist in the formulation of well-informed policies in important areas such as security, privacy and governance. One of the terms that has been at the forefront of these changes is “platform”.

Note that the economic, societal, political, regulatory and technical uses of the word “platform” predate cloud computing by many years.

Taxonomic structures serve many purposes and their topological structure, incorporation (or not) of orthogonal dimensions, levels of refinement, and the decision about the order and approach in which to apply the structuring factors lead to very different outcomes. The terminology and concepts presented in this document can be combined in different ways, depending on the problem being considered, and the factors that potentially influence the decisions driving such structuring are presented with the related concepts.

In a situation where two or more distinct interpretations of the word “platform” are relevant, but only one is taken into account, or where collaborators used two distinct interpretations at cross-purposes, confusion can arise.

Therefore, it is important to understand the difference between the technical, economic and general uses of the word platform in the context of digital services.

The audience for this document is technologists, economists, policy makers, social scientists and others who wish to precisely and unambiguously use these terms (e.g. in multi-disciplinary conversations).

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Information technology — Cloud computing and distributed platforms — Taxonomy for digital platforms

1 Scope

This document specifies a taxonomy related to digital platforms, by providing definitions and supporting information that disambiguates different uses of the term platform as it applies to digital services (such as cloud computing and other distributed computing systems).

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 22123-1, *Information technology — Cloud computing — Part 1: Vocabulary*

ISO/IEC TS 23167, *Information technology — Cloud computing — Common technologies and techniques*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 22123-1, ISO/IEC TS 23167 and the following apply.

ISO and IEC maintain terminology 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 Basic terms

3.1.1
digital service
service offered by one party to another party by means of digital hardware or software technology, or both, including communication over a network

Note 1 to entry: In the context of this document, a service comprises one or more digital capabilities such as a cloud computing, edge computing, or some other distributed computing capability. Such a service will be subject to contract and typically have defined qualities of service, terms, and conditions for use.

Note 2 to entry: Cloud service, edge service, network service, broadcast service, and mobile service are all types of digital service. Not all types are discussed in this document.

3.1.2
digital platform
distributed platform
set of correlated and cohesive *digital services* (3.1.1)

Note 1 to entry: A digital platform as described in this document enables and assists other participant digital services in conducting business with their customers, either by creating and facilitating a multi-sided market for those services, or by enabling the technological creation and operation of those services, or both.

Note 2 to entry: "Distributed platform" is often used as a synonym to emphasise those elements of a digital service, such as edge computing and mobile computing that go beyond the classical datacentres of cloud computing.

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3.2 Terms relating to platform participation

3.2.1
platform participant
<digital platform> party that makes use of or otherwise engages with a *digital platform* (3.1.2)

Note 1 to entry: A party can be an individual end user or organisation.

Note 2 to entry: A platform participant can be a member of one or more *participant groups* (3.2.2).

3.2.2
participant group
group of *platform participants* (3.2.1) that share a common set of business requirements that differ significantly from the requirements of one or more other groups of *platform participants* (3.2.1)

Note 1 to entry: Participant groups are not specific to digital services, though they are essential for defining a multi-sided market such as a *digital economic platform* (3.4.2).

Note 2 to entry: Examples of such participant groups include purchasers, vendors, and developers. Purchasers are platform participants seeking to acquire something, vendors are platform participants seeking to offer something, while developers are platform participants seeking to create and sell (or operate) software (or services). Thus, the members of each group have a common objective which is not shared with members of the other participant groups.

3.3 Terms related to digital technology platforms

3.3.1
digital technology platform
<technology> *digital platform* (3.1.2) that provides engineering components required to support creation and deployment of applications and services

Note 1 to entry: Elements provided can include cloud computing resources (see ISO/IEC 22123 series), which can include execution environments, storage, networking, location and mapping services, graphics rendering and specialist processing (such as machine learning or quantum computing).

Note 2 to entry: Popular examples of such digital technology platforms include varieties of the cloud service categories “infrastructure capabilities type” and “platform capabilities type” (see ISO/IEC 22123-1).

Note 3 to entry: This definition is distinct from those in ISO/IEC TS 25025:2021 and ISO/IEC TS 25011:2017.

3.3.2
software development platform
digital technology platform (3.3.1) that enables or assists the development of software code

3.4 Terms related to digital economic platforms

3.4.1
economic platform
<economics> set of services that provide market intermediation to reduce search or transaction costs

Note 1 to entry: Platforms are environments, computing or otherwise, that connect different groups and derive benefits from others participating in the platform.

Note 2 to entry: A shopping mall provides a non-computing economic platform, connecting merchants (participant group) with visiting customers (participant group) and providing distinct services to each participant group such as a pleasant environment, electricity, storage, parking, network connectivity, and security.

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3.4.2
digital economic platform
<economics> one or more *digital platforms* (3.1.2) creating a multi-sided market, which provide goods, services or licensed rights to two or more distinct *participant groups* (3.2.2) who need each other in some way

Note 1 to entry: A digital economic platform is a subtype of both *economic platform* (3.4.1) and *digital platform* (3.1.2).

Note 2 to entry: Examples of licensed rights can include the right to view a movie, to use commercial business data, or to use specific software, each delivered as a licence.

Note 3 to entry: While a digital economic platform is constructed with digital technology, often on top of a digital technology platform (3.3.1), this does not mean that the digital economic platform is a subtype of digital technology platform (any more than a car is a subtype of a road); these two terms are independent.

Note 4 to entry: A digital economic platform can optionally comprise more than one digital platform. For instance, an exchange platform can be combined with a payment platform and appear to the end-user as a single digital economic platform.

3.4.3
ad-funded platform
<economics> *digital economic platform* (3.4.2) where a platform generates revenue by charging advertisers to show advertisements to customers of the service

Note 1 to entry: Advertisers are one participant group, those who view the advertisements are a second, and those who display the advertisements alongside their own content are a third.

3.4.4
exchange platform
<economics> *digital economic platform* (3.4.2) which brings together vendors and potential purchasers and enables them to sell and buy goods and services, potentially generating value for the platform provider by intermediating the transaction

3.4.5
payment platform
<economics> *digital economic platform* (3.4.2) which facilitates the secure completion of payments between *platform participants* (3.2.1)

3.4.6
application marketplace
<economics> *digital economic platform* (3.4.2) where the platform provides means for software developers and publishers to provide applications to customers via the platform

Note 1 to entry: This document describes this concept in the economic platform domain. See also ISO/IEC 19944-1:2020, 3.2.2 for the definition in the device platform domain.

4 Abbreviated terms

AIaaS	artificial intelligence as a service
CaaS [a]	communications as a service/containers as a service
CSC	cloud service customer
CSP	cloud service provider
DSaaS	data storage as a service
FaaS	function as a service

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GPU	graphics processing unit
IaaS	infrastructure as a service
ICT	information and communications technology
MLaaS	machine learning as a service
PaaS	platform as a service
QCaaS	quantum computing as a service
SaaS	software as a service
SME	small- or medium-sized enterprise

[a] The acronym CaaS is unfortunately used by industry for multiple purposes, two of which are listed here, so it is best to use the expanded term to ensure the correct context.

5 Digital platform overview

5.1 General

The term "platform" is used in the English language with a very wide range of meanings, and some of these uses are ambiguous in the context of online or digital services.

This document defines a taxonomy of terms for digital platforms of various kinds and shows how these terms can be structured into hierarchies (see Annex A).

5.1.1 Meanings of "platform"

These uses include but are not limited to the following. These groupings are potentially overlapping, they are not mutually exclusive.

— The traditional non-ICT uses of the term, such as a wooden platform to stand on, a political platform of policies, or a railway platform from which trains will depart, highlight the highly context-dependent use of the word "platform".

— There are online, broadcast and printed media and public discourse settings, that serve as platforms for free expression, expression of political and social viewpoints, artistic and musical expression, discussion and debate. This includes social media.

— There are what can be defined as "economic platforms", which is a way to describe certain business approaches that create multi-sided markets, where two or more distinct groups of participants can do some kind of business together via an intermediary platform. This means that the platform brings together two or more different participant groups and provides a meeting place to facilitate interactions between the participant groups through the platform. Platforms serving two participant groups are called two-sided platforms, and more generally platforms serving two or more such groups are called multi-sided platforms.

— There are many examples of two-sided markets supported by intermediary platforms, including but not limited to: publishers, academic journals and conferences; airports and ports; stock markets, auction houses and real estate brokers; dating and employment agencies; and credit card payment cloud computing systems. An economic platform does not need to involve any technology.

EXAMPLE A bricks-and-mortar department store or shopping mall creates a multi-sided market between a group of merchants and a group of customers. This type of economic platform existed long before modern digital technology.

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— There have also been "technology platforms" for many years, long predating the arrival of online services. Early computer operating systems such as on mainframes were often described as providing a platform for customer programme development. Specialised systems such as telephone networks provided platforms for the deployment of (then) advanced services such as free-phone and premium-rate telephone lines. PBX systems provided platforms for customer development of early call-centre services. All of these existed long before the arrival of the World Wide Web.

— For these technology products and services, the term "platform" is widely used, both as a simple indicator of layering – with many distinct products and services built on a single underlying base – and to articulate a specific purpose for a product (e.g. providing a platform for self-expression or social interaction).

5.1.2 Meanings of "digital platform"

With the arrival of the World Wide Web, many of the platform concepts described above were adapted to the world of online services, such as online shopping services, online dating, online social networks, and many others. Some of these competed with the pre-online service equivalents, while others were wholly new.

In particular, a market demand rapidly emerged for technology companies to provide means for their customers to rapidly enter the online business world without having to develop everything from scratch themselves. In the same way that companies adopted common operating systems on which to build their applications without having to write specific code for every printer and other device, so the online services need platforms that provided the components common to all or most online services, allowing them to concentrate on those components that were unique to their own service offering.

Thus, the parallel development of digital platforms include both digital economic platforms (business models for multi-sided markets) and digital technology platforms (services and components providing customers with the tools to build their own services).

This document is focused on digital platform as it is used in the context of online or digital services of these two types.

5.2 The ambiguity of "platform" for digital services

Within the realm of digital technologies there are specific situations in which the use of "platform" of even "digital platform" becomes ambiguous.

Both terms are sometimes used for both digital economic platforms and digital technology platforms.

— Digital economic platform is described as one or more digital platforms which provide goods, services or licensed rights to two or more distinct participant groups who need each other in some way. The term "platform" in association to economics, is meant to identify multi-sided business relationships.

— Digital technology platform is described as any kind of system that supports the creation, modification, or addition of significant software functionality by the platform customer rather than by the platform service provider.

These two terms are independent, and either, both, or neither may apply to a digital service (see Table 1).

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