INTERNATIONAL STANDARD

ISO/IEC 23510

First edition
2021-10

Information technology — 3D printing and scanning — Framework for an Additive Manufacturing Service Platform (AMSP)

Technologies de l'information — Impression et balayage 3D — Cadre conceptuel pour une Plateforme de services de fabrication additive (AMSP)

Reference number
ISO/IEC 23510:2021(E)

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Published in Switzerland

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

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Introduction

Additive manufacturing (AM) has been used for rapid prototyping for many years and is increasingly being applied to volume production, mass customization and spare parts production among other use cases. It is possible that low volume prototyping can tolerate simplified, ad hoc or informal interfaces between parts customers and AM service providers. As additive manufacturing capabilities have increased and as demand for additively manufactured parts has increased these informal interfaces are no longer sufficient. Additionally, AM workflows can require the contributions of several service providers in order to achieve the desired outcome. These workflows can need to nimbly adapt to needs specific to that outcome. To do so, a flexible and transparent interface structure is required.

Without interface standards, information exchanges between parts customers and AM service providers, and among collaborating AM service providers, often require ad hoc and expensive manual intervention. Inconsistent descriptions of the characteristics of the services provided can also create confusion, misunderstanding and rework.

The framework for an Additive Manufacturing Service Platform (AMSP) identifies interfaces and their key characteristics where standards can make a beneficial contribution to formalizing the interface for parts submission, design and creation. The Framework for an AMSP also identifies the qualities of an AM service provider that require a standard-consistent specification. The framework for an AMSP does not include these standards; they need to be developed separately. However, it does provide a landscape that clarifies how these standards relate to other elements of the AM ecosystem.

It is hoped that the adoption of this framework and the standards that it calls for will streamline and accelerate the adoption of AM technologies in the manufacturing ecosystem at large, enabling increasingly more complex use cases and richer collaboration between parts customers and a variety of AM service providers.

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Information technology — 3D printing and scanning — Framework for an Additive Manufacturing Service Platform (AMSP)

1 Scope

This document specifies the framework for an Additive Manufacturing Service Platform (AMSP). The following elements are within the scope of this document:

— Overview introducing the stakeholders and workflow of an AMSP.

— Requirements specifying various prerequisite conditions from different aspects.

— Framework defining a general functional architecture based on the identified requirements.

— Use cases showing typical work modes of an AMSP.

This document is applicable when individuals or organizations (e.g. commercial enterprises, government agencies and non-profit organizations) build an AMSP or improve existing ones to provide 3D printing and other services specific to the submission, design and creation of AM parts.

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/ASTM 52900, *Additive Manufacturing — General Principles — Fundamentals and vocabulary*

ISO/ASTM 52901, *Additive manufacturing — General principles — Requirements for purchased AM parts*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/ASTM 52900 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
additive manufacturing service platform
AMSP
platform that uses additive manufacturing technology and information technology to provide services according to users' requirements

Note 1 to entry: Examples of services provided include objects/parts manufactured by AM technology, 3D model designs and other services specific to the submission, design and creation of AM parts.

Note 2 to entry: A typical AMSP usually consists of an online platform to gather requirements of users, a group of skilled staff to deal with users' requirements, 3D scanning equipment, AM machines and different kinds of feedstock.

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Note 3 to entry: A typical AMSP can sometimes cooperate with individuals or organizations professionalized in specific industries (e.g. aerospace, medicine, etc.).

3.2
user
individual or organization that needs parts manufactured by AM technology and would like to turn to an AMSP for service

3.3
designer
individual or organization that performs 3D modelling and 3D scanning assigned by agreement between user and AMSP

3.4
infrastructure as a service
IaaS
cloud service category in which the cloud capabilities type provided to the cloud service user is an infrastructure capabilities type

[SOURCE: ISO/IEC 17788:2014 3.2.24, modified — term "cloud service customer" replaced with "cloud service user".]

3.5
software as a service
SaaS
cloud service category in which the cloud capabilities type provided to the cloud service user is an application capabilities type

[SOURCE: ISO/IEC 17788:2014 3.2.36, modified — term "cloud service customer" replaced with "cloud service user".]

3.6
additive manufacturing centre
AM centre
place where AM parts are manufactured according to the user's requirement

Note 1 to entry: An AM centre may consist of several kinds of AM systems and corresponding feedstock.

Note 2 to entry: An AM centre can be operated by organizations that manage the AMSP or by organizations/individuals who operate AM systems qualified to be registered on the AMSP.

3.7
3-dimensional design model
3D design model
3D model
data set that contains 3-dimensional geometric elements representing the object/part to be manufactured

3.8
technical data package
data set that contains necessary information and can be exchanged or transformed to provide a format that can be used by an AMSP

Note 1 to entry: Examples of "necessary information" in this context include 3D model, colours, materials, lattices, textures, etc.

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