



SLOVENSKI STANDARD
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Zobozdravstvo - Medobratovalnost sistemov CAD/CAM (ISO/DIS 18618:2021)

Dentistry - Interoperability of CAD/CAM Systems (ISO/DIS 18618:2021)

Zahnheilkunde - Interoperabilität der CAD/CAM-Systeme (ISO/DIS 18618:2021)

Médecine bucco-dentaire - Interopérabilité des systèmes de CFAO (ISO/DIS 18618:2021)

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Dentistry — Interoperability of CAD/CAM systems

Médecine bucco-dentaire — Interopérabilité des systèmes de CFAO

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Foreword

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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 ISO documents 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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html. (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 9, *CAD/CAM Systems*.

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This second edition cancels and replaces the first edition (ISO 18618:2018), which has been technically revised.

The main changes compared to the previous edition are as follows:

- Update the XML schema for IDS (interface for dental CAD/CAM systems) examples of interoperability of dental products relating to dental implant system, removables, dental appliance, and orthodontics in Annex due to the fast nature of software system innovation and need for ongoing testing

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

Manufacturers of dental CAD/CAM systems differ in how they exchange manufacturing information and three dimensional data. This causes difficulty in data processing, design processes, and manufacturing processes for users of those systems. In order to overcome these interoperability issues, this document has been prepared to facilitate open interoperability between CAD/CAM systems in dentistry.

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Dentistry — Interoperability of CAD/CAM systems

1 Scope

This document specifies an extensible markup language (XML) format to facilitate the transfer of dental case data and CAD/CAM data between software 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 1942, *Dentistry — Vocabulary*

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country code*

ISO 3950, *Dentistry — Designation system for teeth and areas of the oral cavity*

ISO 16443, *Dentistry — Vocabulary for dental implants systems and related procedure*

ISO 18739, *Dentistry — Vocabulary of process chain for CAD/CAM systems*

ISO 19429:2015, *Dentistry — Designation system for dental implants*

W3C — Extensible Markup Language (XML) 1.0 (Fifth Edition), November 2008

W3C XML Schema Definition Language (XSD) 1.1, 2012

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1942, ISO 16443, ISO 18739, W3C XML1.0, W3C XSD 1.1 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/>

NOTE 1 IDS schema is defined to be the interface for dental CAD/CAM systems. Throughout the IDS schema there are terms that have special meaning or definition. Understanding the use of these terms is the key to well-defined IDS documents that all parties can understand universally.

NOTE 2 The IDS schema defines several peer level nodes immediately within the enveloping root <IDS> element that organizes the IDS document into structures for specific transactions. They represent a submission, a query, an update of a previous submission, a notification of an event or status change and a series of catalogs. A single IDS document can contain a combination of different transaction nodes or consist of only a single transactional node.

NOTE 3 In addition to the transactional nodes mentioned above, the IDS schema also defines several nodes that provide traceability and source identification features as well as provide information on how to reply to a document transaction.

3.1 General terms

ISO/DIS 18618:2021(E)**3.1.1****broker**

entity that acts as a middleman or intermediary

Note 1 to entry: Such organizations take multiple orders from multiple sources and consolidate them into a single order for a Provider or they take single orders from an originator and split them among multiple providers or they just pass orders through between originators and providers.

3.1.2**originator**

entity (organization or person) that is responsible for creating the current document, order, submission, etc.

Note 1 to entry: As such, they are the “originator” of the data being exchanged.

Note 2 to entry: Most often an originator would be a dental practice. In some cases, an originator is a dental laboratory that is outsourcing work to another lab.

3.1.3**provider**

entity (company, lab, etc.) that is responsible for providing the services or products that are being requested in an order

Note 1 to entry: Most often, this would be a dental laboratory or manufacturer.

3.2 Terms and definitions relating to XML content**3.2.1****CADDataCatalog**

collection of nodes describing CAD data associated with one or more of the orders and/or restorations

Note 1 to entry: It can include digital scan and/or design files, etc.
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3.2.2**case**

set of one or more orders for dental appliances, products or services, all of which are being submitted for a single patient

EXAMPLE A case might contain one order for a crown, and another order for a bridge.

3.2.3**catalogs**

data that are referenced in other elements or areas

Note 1 to entry: The catalogs are subdivided by the data they are grouping, making it easier to manage and reference.

3.2.4**DeliveryRequest**

information for the out-going, finished order, which will be sent to the originator (or an originator's agent) as a separate delivery

Note 1 to entry: A delivery is physical, electronic, or both.

3.2.5**dentist**

dentist or responsible clinician who requested the order

3.2.6**DentistCatalog**

collection of *dentist* (3.2.5) nodes that provides attribute and elements to define the dentists being referenced within this document

Note 1 to entry: The definition can include billing information, license information, etc.

3.2.7**ExtraInfo**

child node that can be used to extend the schema with undefined XML

EXAMPLE Many of the elements will contain child nodes with the suffix “ExtraInfo” (i.e. <DentistExtraInfo>, <OrderExtraInfo>, etc. These are intended to be areas that can be used to extend the defined schema with proprietary or undefined XML. For example, an implementation may use one (or more) of these to embed XML that is only of use to the implementer for an internal workflow. Another use could be two business partners using these to experiment with XML they intend to propose for future versions or to pass proprietary XML they have previously defined between themselves. The IDS schema and XSD will ignore the contents of these so they will not be validated as part of the IDS schema. It is highly recommended that if these are used, that any XML be enclosed within some proprietary element tag so that if the XML document passes through multiple handlers there are no conflicts:

```
<DentistExtraInfo>
```

```
  <MyCompanyData>
```

```
    data specific and of use only to “MyCompany”...
```

```
  </MyCompanyData>
```

```
</DentistExtraInfo>
```

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3.2.8**FileCatalog**

collection of <IDSFile> nodes that describe files associated with the <Case>, <Order> or CAD data (scans, design files, etc.)

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3.2.9**host service**

system that receives the IDS document and processes the contents

3.2.10**IdMapCatalog**

collection of <IdMapItem> nodes which provide a means of defining alternate identifiers for key elements within the IDS

3.2.11**notification**

means for publishing or returning a defined status, event or message related to an order

Note 1 to entry: Within the notification node is an untyped element that can be defined according to the needs of the parties exchanging information.

3.2.12**order**

request for a self-contained dental appliance, service or product that is being requested by an originator

Note 1 to entry: Each order in a case might be created or manufactured by a different provider. Each order contains its own delivery (or reply) instruction nodes.

ISO/DIS 18618:2021(E)**3.2.13****OrderCatalog**

collection of <Order> nodes that provide attributes and elements necessary to define or describe an order

Note 1 to entry: An <Order> will often contain one or more <Restoration> nodes but may omit those nodes when not needed.

3.2.14**parcel**

physical package that is mailed

3.2.15**patient**

patient for whom a case is being manufactured

Note 1 to entry: Patient info is not a mandatory part of the IDS schema.

3.2.16**PatientCatalog**

collection of <Patient> nodes that provide attributes and elements to define patients that are referenced in the <Order> or <Case> elements

Note 1 to entry: Because patients are referenced in multiple <Order> nodes and/or multiple <Case> nodes the patient information is grouped into a catalog.

3.2.17**prescription**

written directive from the dentist or responsible clinician to the supplier specifying the product that should be manufactured for the patient

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3.2.18**ProductCatalog**

means for a provider or broker to publish the products that will be available for ordering

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Note 1 to entry: The node provides attribute and elements to define a product, include multiple descriptions in different languages and specify ordering options and variations.

3.2.19**productSKU**

product stocking unit used by manufacturers to identify their products to their internal systems

3.2.20**DataQuery**

method to request data from another system or entity

Note 1 to entry: It provides elements to define the data elements to be searched or matched on as well as elements to define the data requested in response.

3.2.21**submission**

batch or group of one or more <Cases> described in the IDS document

Note 1 to entry: In traditional (non digital) dentistry a submission would be equivalent to receiving a physical package [*parcel* (3.2.14)] containing one or more cases. In the digital IDS realm, the submission represents any combination of one or more physical and/or digital cases that are being "submitted" to a provider for production.

3.2.22**UUID**

universally unique identifier. It will be denoted in the document as string(36) to correspond to the xsd definition for the UUIDTypeDef. 128-bit (16 bytes) number represented as a 36-character string of its hexadecimal presentation (32 characters + separators including leading 0 values) in the format: XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX.

Note 1 to entry: UUIDs are a means of identifying key elements within the document.

Note 2 to entry: An <IdMap> within the <Catalogs> of the document provides a means of equating the UUID with alternate identifiers that carry external meaning, such as a lab management system ids for a dentist, case or patient.

Note 3 to entry: UUID values can have multiple alternate ids in the <IdMap> but each UUID is defined only once and used on a single key element.

EXAMPLE If the UUID “107face6-fc51-4366-805d-2ee23014d835” is assigned to the dentist “smith”, that UUID value may not be used on any other element as a key identifier and may only be used as a reference in other elements needing to associate with that specific dentist.

3.2.23**update**

means to send an abbreviated set of data elements to update or modify a previously submitted <Order>

Note 1 to entry: It contains elements that allow the update to match expected values in addition to providing the new values.

3.2.24**providerIds**

identifiers used by *broker* (3.1.1) and *originator* (3.1.2) to identify *provider* (3.1.3), or provider to identify itself.

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3.2.25**brokerIds**

identifiers used by *broker* (3.1.1) to identify itself, or *originator* (3.1.2) and *provider* (3.1.3) to identify broker.

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3.2.26**character data (CDATA)**

a certain portion of the document is general character data, rather than non-character data or character data with a more specific, limited structure. CDATA is used for distinct, but related, purposes in the markup languages SGML and XML.

4 Data security and storage methods

The Internet has proven to be an effective means of communication, yet its vulnerability to interception raises issues of privacy, authentication and integrity of the communicated message. Therefore, data security is of utmost importance to users of dental information systems.

Because of the personal and private nature of health records, the dental practitioner needs to understand the security issues associated with “data at rest” and “data in transit.” This document is not intended to explain security concepts and the risks associated with the maintenance of data in storage and transit, and over an internet connection. The ADA Standards Committee on Dental Informatics has published a series of technical reports that provide dental practitioners with guidelines in addressing issues of security of data in storage and transmission over the Internet.

A ZIP file format is recommended for transport of the IDS XML file and related files, however, implementation of a file container is left up to the implementer.

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5 Naming

The file name shall end with an .ids extension. The file name can be prepended with any naming convention that the user desires.

6 Tooth numbering system

Throughout the entire document, the tooth number system shall be based on ISO 3950 for tooth numbering.

7 Measurement units

All units are in millimetres unless otherwise specified.

8 Additional restrictions on IDS XML documents

In addition to the schema provided above, a valid IDS document shall also meet the following requirements.

- a) The total length of the document shall not exceed 2 megabytes (MB).
- b) The document shall contain a unique identifier for ProviderIds.
- c) The document shall contain a unique identifier for BrokerIds.

9 XSD Description

The definition of the elements of the XSD schema provided in [Annex A](#) shall be used. A sample XML schema of IDS is shown in Annex B. The XSD definition document is available by e-mailing standards@ada.org.

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Annex A (normative)

XML schema for IDS

A.1 General

NOTE Below is a description of the IDS schema. Please note the following conventions used in this annex:

- a) An asterisk (*) denotes a **required** XML node or attribute. Unless marked with an asterisk, all nodes and attributes are considered optional. Note that some optional nodes have required attributes, which means that if the node is present at all, then those attributes marked with * are also present.
- b) For nodes and attributes of type "String," the allowed length of the string is unlimited unless the length is specified [e.g. String(100)].
- c) The data type "Datetime UTC" implies a DateTime value, in accordance with ISO 8601.
- d) All data types refer to the XML schema data types: string, integer, boolean, dateTime, etc.

A.2 XML schema for IDS root

The detailed information of XML schema for IDS Root and subdirectories are given from Table A.1 to Table A.3.

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Table A.1 — The description of the root directory of IDS

IDS *		
The root node for all IDS documents.		
Attribute	Data Type	Description
IDSVersion *	String(10)	The version identifier of the XML schema of the message.
IDSUUID *	String(36)	A globally unique identifier for the IDS message.

Table A.2 — The description of the directory of IDS/IDSSource

IDS/IDSSource		
An optional node describing the system from which the document originates.		
Attribute	Data Type	Description
HostName	String(100)	The network name of the source host system creating and sending the message.
IPAddress	String(15)	An IPv4 address of the source host system creating and sending the message.
IPAddress6	String(45)	An IPv6 address of the source host system creating and sending the message.
MACAddress	String(15)	A MAC address of the source host system creating and sending the message.
OperatorID	String(100)	A network user identifier for the user account on the source host system creating and sending the message.
NetworkDomain	String(100)	A network name identifier for the domain containing the system sending the message.
ApplicationName	String(100)	A value indicating the application (by name) that was used to generate or originate the IDS message.