

Exchange formats for the Audit Data Collection Standard: XML and JSON

WD stage

Warning for WDs and CDs

This document is not an ISO International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

To help you, this guide on writing standards was produced by the ISO/TMB and is available at <https://www.iso.org/iso/how-to-write-standards.pdf>

A model manuscript of a draft International Standard (known as "The Rice Model") is available at https://www.iso.org/iso/model_document-rice_model.pdf

© ISO 2021

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-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

| | |
|---|-----------|
| Foreword | iv |
| Introduction | v |
| 1 Scope | 1 |
| 2 Normative references | 1 |
| 3 Terms and definitions..... | 1 |
| 4 Exchange Formats | 3 |
| 4.1 General..... | 3 |
| 4.2 XML..... | 4 |
| 4.2.1 General..... | 4 |
| 4.2.2 Technical guideline..... | 4 |
| 4.2.3 XML Schema..... | 5 |
| 4.2.4 XML Sample..... | 10 |
| 4.3 JSON..... | 11 |
| 4.3.1 General..... | 11 |
| 4.3.2 Technical guideline..... | 11 |
| 4.3.3 JSON Schema..... | 13 |
| 4.3.4 JSON Sample message..... | 16 |
| 4.4 CSV..... | 17 |
| 4.4.1 General..... | 17 |
| 4.4.2 Technical guideline..... | 17 |
| 4.4.3 CSV validation..... | 18 |
| 4.4.4 CSV Sample..... | 18 |
| 4.5 Mapping ISO 21378-2019 ADCS Tables to XML and JSON | 20 |
| 4.5.1 Mapping Table sample..... | 20 |
| 4.6 Cross topics | 21 |
| 4.6.1 General..... | 21 |
| 4.6.2 Character encoding conventions..... | 21 |
| 4.6.3 Versioning..... | 22 |
| 4.6.4 Multi-platform and multi-system data transfer..... | 22 |
| 4.6.5 Reduce file size (TBD)..... | 22 |
| 4.6.6 File Compression (TBD)..... | 22 |
| 4.6.7 Conventions of folder naming and file naming (TBD)..... | 23 |
| 4.6.8 Representation of special field types..... | 23 |
| 4.6.9 Extension mechanism..... | 24 |
| 4.6.10 Encryption of sensible data (TBD) | 24 |
| Annex A XML Tags abbreviation List | 25 |
| Annex B List of XML Schema's | 29 |
| Annex C List of JSON Schema's..... | 32 |
| Bibliography..... | 35 |

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO 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).

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 Project Committee ISO/PC 295, *Audit data collection*.

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

Accounting and Enterprise Resource Planning (ERP) software packages are widely used in businesses and by various government organizations to manage and track business processes, post transactions and produce financial reports. Because of the nature of the information contained within the ERP systems, the data are also leveraged by internal and external auditors to assess the business controls, processes and financial reporting. There are numerous ERP packages that are used by businesses and government organizations, which can vary greatly in design (e.g. interfaces, data content, data formats, operational reports, management reports, financial reports). These and other design differences present challenges in the collection of data for auditing supervision management purposes.

This document concerns the specification of technical exchange formats as output file formats for the functional content defined in the international standard Audit Data Collection ISO 21378:2019.

Exchange formats for Audit Data Collection Standard:

XML and JSON

1 Scope

The Audit Data Collection ISO 21378:2019 (ADCS) defines the functional requirements for exchanging audit data in flat file format. This document concerns the specification of technical exchange formats in XML, JSON and flat file (CSV) as output file formats for the functional content defined in the international standard Audit Data Collection ISO 21378:2019.

Besides this document the deliverable contains per ADCS Table:

- a. XML Schema
- b. XML Sample file
- c. JSON Schema
- d. JSON Sample file

To keep the three exchange formats (XML, JSON, CSV) consistent, we will also explain how to use the technical solution in the CSV format.

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.

- a. REC-xml-19980210 Extensible Markup Language (XML) 1.0 W3C Recommendation 10-February-1998,
- b. XML Schema 1.1 Part 1: Structures
- c. XML Schema 1.1 Part 2: Datatypes
- d. RFC4627 The application/json Media Type for JavaScript Object Notation (JSON)
- e. JSON Schema definition specifications on: <https://json-schema.org/specification-links.html>

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- a. ISO Online browsing platform: available at <https://www.iso.org/obp>
- b. IEC Electropedia: available at <http://www.electropedia.org/>

3.1

data

set of values of qualitative or quantitative variables

3.3

data element

basic unit of identifiable and definable *data* (3.1)

[SOURCE: ISO 2146:2010, 3.4, modified — The admitted term "element" has been deleted.]

3.4

data file

collection of *data* (3.1) records having a homogeneous structure

[SOURCE: ISO 14825:2011, 3.1.2, modified — The word "related" and the note to entry have been deleted.]

3.5

data interface

set of rules that related two independent systems in a way that allows cross-system interactions

3.6

data profiling

activities that are performed to understand the *data structures* (3.8) and system rules that affect the extraction of audit *data* (3.1)

3.7

data structure

framework comprising a number of *data elements* (3.3) in a prescribed form

[SOURCE: ISO 21007-1:2005, 2.16, modified — "element" has been deleted from the term.]

3.8

primary key

minimum set of attributes that uniquely specify a record in a table

3.9

reference identifier

foreign key

<in a relation> one or a group of attributes that corresponds to a *primary key* (3.9) in another relation

[SOURCE: ISO/IEC 20944-1:2013, 3.14.4.15, modified — The preferred term "reference identifier" has been added.]

3.10

syntax

set of rules, principles and processes that govern the *data structure* (3.8)

etc. etc.....

4 Exchange Formats

4.1 General

The data format is the carrier of data exchange between auditor and auditee. So it is necessary to make an agreement on data format between the two sides in data exchange. There are multiple options for output data formats.

In case of ADCS, three exchange formats are specified:

1. XML files defined by XML Schema specification (W3C).
2. JSON files defined JSON Schema (Version 0.6) specification.
3. CSV files

These three formats will contain the same functional ADCS content specification, but will differ on the technical level only.

This means that these exchange formats are convertible from one to the other. For instance, you could convert XML files to CSV files or CSV files to JSON files.

To generate the schema's in a consistent way, a data model was set up from the Audit Data Collection ISO 21378:2019. Each ADCS table is modeled into a parent entity and reusable data groups within a table are modeled into child entities, e.g. "Physical Address", "Billing Address", "Tax", "Created", "Modified", "Posted" etc. For the functional content, see the specifications of the "Audit Data Collection Data Model".

In the following chapters the various technical specifications are explained and the additional packaging and communication agreements are defined.

4.2 XML

4.2.1 General

XML is the abbreviation of Extensible Markup Language and a subset of Standard General Markup Language. It is a kind of Markup language used to mark an electronic document to make it structured.

4.2.2 Technical guideline

Only one ADC table, with a number of repeating lines, must be sent in one XML file.

The filename must comply with the rules described in chapter 4.6.7.

Each ADC table has its own XML-Schema to define its XML-file. So when there are 71 tables, there are 71 XML-Schema's.

Such an XML file contains (schematic):

```
<?xml version='1.0' encoding='UTF-8'?>
<root-tag
  xsi:schemaLocation='name-space xml-schema-name.xsd'
  xmlns='name-space'
  xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance'>
  <table-line-tag>
    <data-element-tag>value</data-element-tag>
    <group-tag>
      <data-element-tag>value</data-element-tag>
    </group-tag>
  </table-line-tag>
</root-tag>
```

Italics printed text should be replaced by the definitions in this document and XML tag definitions from ADC data catalog.

4.2.2.1 Root tag

The roottag equals "Adc" followed by the ADC table name like: "AdcApAdjustments".

Used table names are taken from the ISO 21378:2019 specifications.

4.2.2.2 Target name space definition

The target name space equals "http://schemas.iso.org/AdcsML/Messages/" followed by the message name and message version like: "http://schemas.iso.org/AdcsML/Messages/AdcApAdjustments-v1"

4.2.2.3 Construction of short XML tags

XML tags are in a first step derived from the data element names, and in a second step shortened in a consistent manner, according to an abbreviations list (see Appendix A). This will reduce the size of the XML files.

4.2.2.4 Optional fields

Optional fields and optional groups of fields can be omitted from the XML file.

4.2.2.5 Repeating groups

Repeating groups like “Tax” can occur up to the maximum number that is defined in the XML Schema.

4.2.2.6 Special characters to be escaped

| | | |
|--------|---|----------------|
| < | < | less than |
| > | > | greater than |
| & | & | ampersand |
| ' | ' | apostrophe |
| " | " | quotation mark |

4.2.3 XML Schema

Each XML file can be validated by using it's own XML-Schema. The name of this schema is equal to the root tag name followed by the version of the message like: “AdcApAdjustments-v1.0.xsd”

The XML Schema is derived from the Audit Data Collection Data Model.

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- XML Definition of message hierarchy -->
<!-- Message:      ADC AP Adjustments v1.0 -->
<!-- Message Rev.: 7 -->
<!-- Transaction:  AA - Audit Data Collection -->
<!-- Transaction Rev.: 235 -->
<!-- Datamodel:    Audit Data Collection Datamodel, version HEAD -->
<!-- Datamodel Rev.: 312 -->
<!-- Definition type: W3C Schema (http://www.w3.org/XML/Schema) -->
<!-- XML tagset used: AdcsML -->
<!-- Generated at:  23-01-2021 17:45:20 -->
<!-- NOTE: This schema was generated automatically: manual modifications will be lost -->
<!-- NOTE: Additional rules/conditions regarding the definition may exist, see functional hierarchical specification -->
<xsd:schema xmlns:str="http://schemas.iso.org/AdcsML/Messages/AdcApAdjustments-v1"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema" targetNamespace="http://schemas.iso.org/AdcsML/Messages/AdcApAdjustments-v1"
  elementFormDefault="qualified" attributeFormDefault="unqualified" version="1.0">
  <xsd:element name="AdcApAdjustments">
    <xsd:annotation>
      <xsd:documentation>MESSAGE</xsd:documentation>
    </xsd:annotation>
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="ApAdj" minOccurs="0" maxOccurs="unbounded">
          <xsd:annotation>
            <xsd:documentation>AP ADJUSTMENT</xsd:documentation>
          </xsd:annotation>
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element name="AdjId" type="str:TypId100" minOccurs="1" maxOccurs="1">
                <xsd:annotation>
                  <xsd:documentation>Adjustment ID</xsd:documentation>
                </xsd:annotation>
              </xsd:element>
              <xsd:element name="AdjNr" type="str:TypText100" minOccurs="1" maxOccurs="1">
                <xsd:annotation>
                  <xsd:documentation>Adjustment Number</xsd:documentation>
                </xsd:annotation>
              </xsd:element>
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>
```

```

<xsd:element name="AdjTypNm" type="str:TypText60" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Adjustment Type Name</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="AdjDocNr" type="str:TypText100" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Adjustment Document Number</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="InvoId" type="str:TypId60" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Invoice ID</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="JrnlId" type="str:TypId100" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Journal ID</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="FiscYr" type="str:TypYrId" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Fiscal Year</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="AcntingPer" type="str:TypPerId" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Accounting Period</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="AdjDt" type="str:TypDt" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Adjustment Date</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="SuplAcntId" type="str:TypId100" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Supplier Account ID</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="GIDbAcntNr" type="str:TypGIAcntNr" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>GL Debit Account Number</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="GICrAcntNr" type="str:TypGIAcntNr" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>GL Credit Account Number</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="BusSgX" type="str:TypText25" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Business Segment X</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="AdjAmt" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>ap adjustment - ADJUSTED AMOUNT</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="FuncAmt" type="str:TypAmt" minOccurs="1" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Functional Amount</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="FuncCurCd" type="str:TypCurCd" minOccurs="1" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Functional Currency Code</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="TrAmt" type="str:TypAmt" minOccurs="1" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Transaction Amount</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>

```

```

<xsd:element name="TrCurCd" type="str:TypCurCd" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Transaction Currency Code</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="RprtAmt" type="str:TypAmt" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Reporting Amount</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="RprtCurCd" type="str:TypCurCd" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Reporting Currency Code</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="LocAmt" type="str:TypAmt" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Local Amount</xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="LocCurCd" type="str:TypCurCd" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>Local Currency Code</xsd:documentation>
  </xsd:annotation>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:element>
<xsd:element name="Tax" minOccurs="0" maxOccurs="4">
  <xsd:annotation>
    <xsd:documentation>ap adjustment - TAX</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="TaxTypCd" type="str:TypTaxTypCd" minOccurs="1" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Tax Type Code</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="TaxLocAmt" type="str:TypAmt" minOccurs="1" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Tax Local Amount</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="GITaxDbAcntNr" type="str:TypGIAcntNr" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>GL Tax Debit Account Number</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="GITaxCrAcntNr" type="str:TypGIAcntNr" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>GL Tax Credit Account Number</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element name="Crea" minOccurs="1" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>ap adjustment - CREATED</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="UserId" type="str:TypId25" minOccurs="1" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>User ID</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="Dt" type="str:TypDt" minOccurs="1" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Date</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="Tm" type="str:TypTm" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Time</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>

```

```

        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element name="Aprv" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>ap adjustment - APPROVED</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="UserId" type="str:TypId25" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>User ID</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="Dt" type="str:TypDt" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Date</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="Tm" type="str:TypTm" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Time</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element name="LstMdf" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>ap adjustment - LAST MODIFIED</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="UserId" type="str:TypId25" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>User ID</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="Dt" type="str:TypDt" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Date</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element name="Tm" type="str:TypTm" minOccurs="0" maxOccurs="1">
        <xsd:annotation>
          <xsd:documentation>Time</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:element>
<xsd:sequence>
  <xsd:complexType>
    <xsd:element>
      <xsd:simpleType name="TypAmt">
        <xsd:restriction base="xsd:decimal">
          <xsd:totalDigits value="22"/>
          <xsd:fractionDigits value="4"/>
        </xsd:restriction>
      </xsd:simpleType>
      <xsd:simpleType name="TypCurCd">
        <xsd:annotation>
          <xsd:documentation>ISO 4217, codes for representation of currencies.</xsd:documentation>
        </xsd:annotation>
        <xsd:restriction base="xsd:string">
          <xsd:length value="3"/>
        </xsd:restriction>
      </xsd:simpleType>
      <xsd:simpleType name="TypDt">
        <xsd:restriction base="xsd:date"/>
      </xsd:simpleType>

```

```

<xsd:simpleType name="TypGIAcntNr">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="100"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypId100">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="100"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypId25">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="25"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypId60">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="60"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypPerId">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="15"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypTaxTypCd">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="25"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypText100">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="100"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypText25">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="25"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypText60">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="60"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypTm">
  <xsd:restriction base="xsd:string">
    <xsd:maxLength value="8"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="TypYrld">
  <xsd:restriction base="xsd:nonNegativeInteger">
    <xsd:totalDigits value="4"/>
  </xsd:restriction>
</xsd:simpleType>
</xsd:schema>

```

An overview of the existing XML schema's can be found in Annex B

4.2.4 XML Sample

In the following example there's one ADC table with one line in one XML file:

```
<?xml version="1.0" encoding="UTF-8"?>
<AdcApAdjustments xsi:schemaLocation="http://schemas.iso.org/AdcsML/Messages/AdcApAdjustments-v1 AdcApAdjustments-v1.0.xsd"
  xmlns="http://schemas.iso.org/AdcsML/Messages/AdcApAdjustments-v1"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <ApAdj>
    <AdjId>AD1234</AdjId>
    <AdjNr>123456789</AdjNr>
    <AdjTypNm>Finance charge.</AdjTypNm>
    <AdjDocNr>123456789</AdjDocNr>
    <Invoild>I001</Invoild>
    <JrnId>JRN1</JrnId>
    <FiscYr>2020</FiscYr>
    <AcntingPer>M1</AcntingPer>
    <AdjDt>2020-02-01</AdjDt>
    <SuplAcntId>S00001</SuplAcntId>
    <GIDbAcntNr>ACC123456789</GIDbAcntNr>
    <GICrAcntNr>ACC123456789</GICrAcntNr>
    <BusSgX>BS001</BusSgX>
    <AdjAmt>
      <FuncAmt>125.1255</FuncAmt>
      <FuncCurCd>USD</FuncCurCd>
      <TrAmt>125.1255</TrAmt>
      <TrCurCd>USD</TrCurCd>
      <RprtAmt>125.1255</RprtAmt>
      <RprtCurCd>USD</RprtCurCd>
      <LocAmt>125.1255</LocAmt>
      <LocCurCd>USD</LocCurCd>
    </AdjAmt>
    <Tax>
      <TaxTypCd>TAX01</TaxTypCd>
      <TaxLocAmt>2000.0000</TaxLocAmt>
      <GITaxDbAcntNr>ACC123456789</GITaxDbAcntNr>
      <GITaxCrAcntNr>ACC123456789</GITaxCrAcntNr>
    </Tax>
    <Crea>
      <UserId>JD</UserId>
      <Dt>2020-03-02</Dt>
      <Tm>09:31</Tm>
    </Crea>
    <Aprv>
      <UserId>JD</UserId>
      <Dt>2020-03-02</Dt>
      <Tm>09:31</Tm>
    </Aprv>
    <LstMdf>
      <UserId>JD</UserId>
      <Dt>2020-03-02</Dt>
      <Tm>09:31</Tm>
    </LstMdf>
  </ApAdj>
</AdcApAdjustments>
```


4.3 JSON

4.3.1 General

JSON is the abbreviation of JavaScript Object Notation, which is an open-standard and text-based data exchange format. JSON uses human-readable text to transmit data objects.

4.3.2 Technical guideline

Only one ADC table, with a number of repeating lines, must be sent in one JSON file.

The filename must comply with the rules described in chapter 4.6.7.

Each ADC table has its own JSON-Schema to define its JSON-file. So when there are 71 tables, there are 71 JSON-Schema's.

JSON uses the same tags as XML.

Such a JSON file contains (schematic):

```
{
  "table-line-tag": [ {
    "data-element-tag": "value",
    "group-tag": {
      "data-element-tag": "value"
    }
  } ]
}
```

Italics printed text should be replaced by the definitions in this document and JSON tag definitions from ADC data catalog.

4.3.2.1 Root tag

When decided to use a root tag in JSON, the roottag equals "Adc" followed by the ADC table name like: "AdcApAdjustments".

Used table names are taken from the ISO 21378:2019 specifications.

4.3.2.2 Target name space definition

When required in JSON, the XML target name space will be used.

The target name space equals "http://schemas.iso.org/AdcsML/Messages/" followed by the message name and message version like:

"http://schemas.iso.org/AdcsML/Messages/AdcApAdjustments-v1"

4.3.2.3 Construction of JSON tags

JSON uses the XML tags.

XML tags are in a first step derived from the field names, and in a second step shortened in a consistent manner, according to an abbreviations list (see Appendix A). This will reduce the size of the JSON files.

4.3.2.4 Optional fields

Optional fields and optional groups of fields can be omitted from the JSON file.

4.3.2.5 Repeating groups

Repeating groups like “Tax” can occur up to the maximum number that is defined in the JSON- Schema. In case of a repeating group all occurrences in total will be enclosed by square hooks [].

Example 1: Repeating group Tax with only one occurrence:

```
"Tax": [{
  "TaxTypCd": "TAX01",
  "TaxLocAmt": 2000.0000,
  "GITaxDbAcntNr": "ACC123456789",
  "GITaxCrAcntNr": "ACC123456789"
}],
```

Example 2: Repeating group Tax with 4 occurrences:

```
"Tax": [{
  "TaxTypCd": "TAX01",
  "TaxLocAmt": 2000.0000,
  "GITaxDbAcntNr": "ACC123456789",
  "GITaxCrAcntNr": "ACC123456789"
},
{
  "TaxTypCd": "TAX02",
  "TaxLocAmt": 2000.0000,
  "GITaxDbAcntNr": "ACC123456789",
  "GITaxCrAcntNr": "ACC123456789"
},
{
  "TaxTypCd": "TAX03",
  "TaxLocAmt": 2000.0000,
  "GITaxDbAcntNr": "ACC123456789",
  "GITaxCrAcntNr": "ACC123456789"
},
{
  "TaxTypCd": "TAX04",
  "TaxLocAmt": 2000.0000,
  "GITaxDbAcntNr": "ACC123456789",
  "GITaxCrAcntNr": "ACC123456789"
}
],
```

4.3.2.6 Special characters to be escaped

The following characters are reserved characters and can not be used in JSON and must be properly escaped to be used in strings:

Backspace to be replaced with \b

Form feed to be replaced with \f

Newline to be replaced with \n

Carriage return to be replaced with \r

Tab to be replaced with \t

Double quote to be replaced with \"

Backslash to be replaced with \\

4.3.3 JSON Schema

Each JSON file can be validated by using it's own JSON-Schema. The name of this schema is equal to the root tag name followed by the version of the message like:

"AdcApAdjustments-v1.0.json"

The JSON Schema is derived from the Audit Data Collection Data Model.

```
{
  "$schema": "http://json-schema.org/draft-06/schema#",
  "$id": "http://schemas.iso.org/AdcsML/Messages/AdcApAdjustmentsDetails_jsd6-v1",
  "description": "JSON Definition of message hierarchy: ADC AP Adjustments Details v1.0",
  "modelRef": [
    "Message:      ADC AP Adjustments Details v1.0",
    "Message Rev.: 2",
    "Transaction:  AA - Audit Data Collection",
    "Transaction Rev.: 235 - Audit Data Collection",
    "Datamodel:     Audit Data Collection Datamodel, version HEAD",
    "Datamodel Rev.: 312",
    "XML tagset used: AdcsML",
    "Generated at:  23-01-2021 17:46:26",
    "Generated using: EC-Design 2.5.0 (http://www.ec-design.nl)",
    "NOTE:  This schema was generated automatically: manual modifications will be lost",
    "NOTE:  Additional rules/conditions regarding the definition may exist, see functional hierarchical specification"
  ],
  "type": "object",
  "additionalProperties": false,
  "properties": {
    "ApAdjDtls": {
      "type": "array",
      "title": "AP ADJUSTMENT DETAILS",
      "minItems": 0,
      "maxItems": 999999,
      "items": {
        "type": "object",
        "additionalProperties": false,
        "properties": {
          "AdjId": {
            "$ref": "##/definitions/domains/TypId100",
            "title": "Adjustment ID"
          },
          "AdjLnId": {
            "$ref": "##/definitions/domains/TypId60",
            "title": "Adjustment Line ID"
          },
          "AdjLnNr": {
            "$ref": "##/definitions/domains/TypText10",
            "title": "Adjustment Line Number"
          },
          "InvoId": {
            "$ref": "##/definitions/domains/TypId60",
            "title": "Invoice ID"
          },
          "InvoiLnId": {
            "$ref": "##/definitions/domains/TypId60",
            "title": "Invoice Line ID"
          },
          "JrnId": {
            "$ref": "##/definitions/domains/TypId100",
            "title": "Journal ID"
          },
          "GIDbAcntNr": {
            "$ref": "##/definitions/domains/TypGIACntNr",
            "title": "GL Debit Account Number"
          },
          "GICrAcntNr": {
            "$ref": "##/definitions/domains/TypGIACntNr",
            "title": "GL Credit Account Number"
          },
          "BusSgX": {
            "$ref": "##/definitions/domains/TypText25",

```

```

        "title": "Business Segment X"
    },
    "AdjAmt": {
        "type": "object",
        "additionalProperties": false,
        "properties": {
            "FuncAmt": {
                "$ref": "#/definitions/domains/TypAmt",
                "title": "Functional Amount"
            },
            "FuncCurCd": {
                "$ref": "#/definitions/domains/TypCurCd",
                "title": "Functional Currency Code"
            },
            "TrAmt": {
                "$ref": "#/definitions/domains/TypAmt",
                "title": "Transaction Amount"
            },
            "TrCurCd": {
                "$ref": "#/definitions/domains/TypCurCd",
                "title": "Transaction Currency Code"
            },
            "RprtAmt": {
                "$ref": "#/definitions/domains/TypAmt",
                "title": "Reporting Amount"
            },
            "RprtCurCd": {
                "$ref": "#/definitions/domains/TypCurCd",
                "title": "Reporting Currency Code"
            },
            "LocAmt": {
                "$ref": "#/definitions/domains/TypAmt",
                "title": "Local Amount"
            },
            "LocCurCd": {
                "$ref": "#/definitions/domains/TypCurCd",
                "title": "Local Currency Code"
            }
        },
        "required": [ "FuncAmt", "FuncCurCd", "TrAmt", "TrCurCd" ]
    },
    "Tax": {
        "type": "array",
        "title": "ap adjustment details - TAX",
        "minItems": 0,
        "maxItems": 4,
        "items": {
            "type": "object",
            "additionalProperties": false,
            "properties": {
                "TaxTypCd": {
                    "$ref": "#/definitions/domains/TypTaxTypCd",
                    "title": "Tax Type Code"
                },
                "TaxLocAmt": {
                    "$ref": "#/definitions/domains/TypAmt",
                    "title": "Tax Local Amount"
                },
                "GltaxDbAcntNr": {
                    "$ref": "#/definitions/domains/TypGltaxAcntNr",
                    "title": "GL Tax Debit Account Number"
                },
                "GltaxCrAcntNr": {
                    "$ref": "#/definitions/domains/TypGltaxAcntNr",
                    "title": "GL Tax Credit Account Number"
                }
            },
            "required": [ "TaxTypCd", "TaxLocAmt" ]
        }
    },
    "required": [ "AdjId", "AdjLnId", "AdjLnNr", "InvoId", "InvoLnId", "AdjAmt" ]
}

```

```

"definitions": {
  "domains": {
    "TypAmt": {
      "type": "number",
      "multipleOf": 0.0001,
      "title": "AMOUNT"
    },
    "TypCurCd": {
      "type": "string",
      "minLength": 3,
      "maxLength": 3,
      "title": "CURRENCY CODE"
    },
    "TypGLAcntNr": {
      "type": "string",
      "maxLength": 100,
      "title": "GL ACCOUNT NUMBER"
    },
    "TypId100": {
      "type": "string",
      "maxLength": 100,
      "title": "IDENTIFIER 100"
    },
    "TypId60": {
      "type": "string",
      "maxLength": 60,
      "title": "IDENTIFIER 60"
    },
    "TypTaxTypCd": {
      "type": "string",
      "maxLength": 25,
      "title": "TAX TYPE CODE"
    },
    "TypText10": {
      "type": "string",
      "maxLength": 10,
      "title": "TEXT 10"
    },
    "TypText25": {
      "type": "string",
      "maxLength": 25,
      "title": "TEXT 25"
    }
  }
}

```

An overview of the existing JSON schema's can be found in Annex C

4.3.4 JSON Sample message

In the following example there's one table with one line in one JSON file:

```
{
  "ApAdj": [ {
    "AdjId": "AD1234",
    "AdjNr": "123456789",
    "AdjTypNm": "Finance charge.",
    "AdjDocNr": "123456789",
    "InvoId": "I001",
    "JrnId": "JRN1",
    "FiscYr": 2020,
    "AcntingPer": "M1",
    "AdjDt": "2020-02-01",
    "SuplAcntId": "S00001",
    "GIDbAcntNr": "ACC123456789",
    "GICrAcntNr": "ACC123456789",
    "BusSgX": "BS001",
    "AdjAmt": {
      "FuncAmt": 125.1255,
      "FuncCurCd": "USD",
      "TrAmt": 125.1255,
      "TrCurCd": "USD",
      "RprtAmt": 125.1255,
      "RprtCurCd": "USD",
      "LocAmt": 125.1255,
      "LocCurCd": "USD"
    },
    "Tax": [ {
      "TaxTypCd": "TAX01",
      "TaxLocAmt": 2000.0000,
      "GITaxDbAcntNr": "ACC123456789",
      "GITaxCrAcntNr": "ACC123456789"
    } ],
    "Crea": {
      "UserId": "JD",
      "Dt": "2020-03-02",
      "Tm": "09:31"
    },
    "Aprv": {
      "UserId": "JD",
      "Dt": "2020-03-02",
      "Tm": "09:31"
    },
    "LstMdf": {
      "UserId": "JD",
      "Dt": "2020-03-02",
      "Tm": "09:31"
    }
  } ]
}
```

4.4 CSV

4.4.1 General

To keep the three exchange formats (XML, JSON, CSV) consistent, we will also explain how to use the technical solutions in the CSV format. The specifications of these three technical exchange formats will be defined in a consistent manner, so that conversion between formats will be possible.

4.4.2 Technical guideline

A comma-separated values (CSV) file, with the filename ending in .csv, stores tabular data, including numbers and text, in plain text. In the CSV file, each line of the file is a data record and each record consists of one or more fields, which are separated by commas, semicolons or other delimiters.

Only one table, with a number of repeating lines, must be sent in one CSV file.

Such a file contains (schematic):

```
"data-element-tag";"group-tag.data-element-tag"<line break>
"value";"value"<line break>
"value";"value"<optional line break>
```

Italics printed text should be replaced by XML tags defined in the Audit Data Collection Data Model.

In the above example a semicolon is used as a column delimiter, however this can also be another character like comma (,) or pipe (|).

<line break> should be replaced by the line break characters used on the target operating system (e.g. CR/LF on Windows and LF on Unix systems).

<optional line break> the last line can contain an optional line break. Software processing ADCS data should skip empty lines in the ADCS CSV files, in order realize robust processing software.

4.4.2.1 Construction of column header tags

CSV files use the XML tags as column header tags.

XML tags are in a first step derived from the field names, and in a second step shortened in a consistent manner, according to an abbreviations list (see Appendix A).

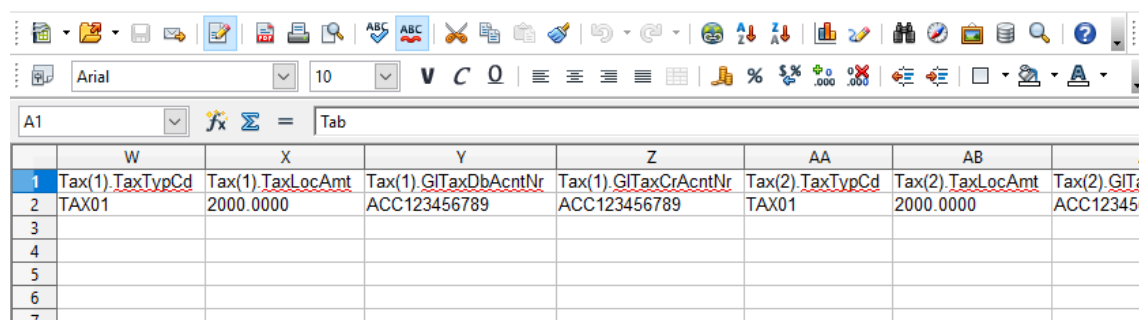
4.4.2.2 Representation of (repeating) groups

Column tags of data elements which belong to a group will have the group tag followed by a dot (.) and followed by their own tag. For instance "FuncAmt" in group "AdjdAmt" will have column header tag "AdjdAmt.FuncAmt".

Column header tags of data elements within a repeating group are prefixed by the group tag plus a number between () from 1 to the maximum number of repeats and then separated from the element tag by a dot ".".

For instance the repeating group "Tax":

Tax(1).TaxTypeCd, Tax(1).TaxLocAmt, Tax(2).TaxTypeCd, Tax(2).TaxLocAmt, etc. until 4.



| | W | X | Y | Z | AA | AB | |
|---|-----------------|------------------|----------------------|----------------------|-----------------|------------------|----------------------|
| 1 | Tax(1).TaxTypCd | Tax(1).TaxLocAmt | Tax(1).GlTaxDbAcntNr | Tax(1).GlTaxCrAcntNr | Tax(2).TaxTypCd | Tax(2).TaxLocAmt | Tax(2).GlTaxCrAcntNr |
| 2 | TAX01 | 2000.0000 | ACC123456789 | ACC123456789 | TAX01 | 2000.0000 | ACC123456789 |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |

4.4.2.3 Numerical data

Numerical data can be exchanged without being enclosed by double quotes (""). Numerical data can contain the dot character (.) as decimal separator. Other separators (for example thousand separator) are not allowed.

4.4.2.4 Special characters to be escaped

Quotation mark ("). If this character occurs in the data it should be doubled like "".

4.4.2.5 Optional fields

Although certain fields or columns may not be required, in a CSV file the columns with their column header must always be present. For an optional field that is not present we will see two adjacent column separators in the CSV file (f.i. ;).

4.4.3 CSV validation

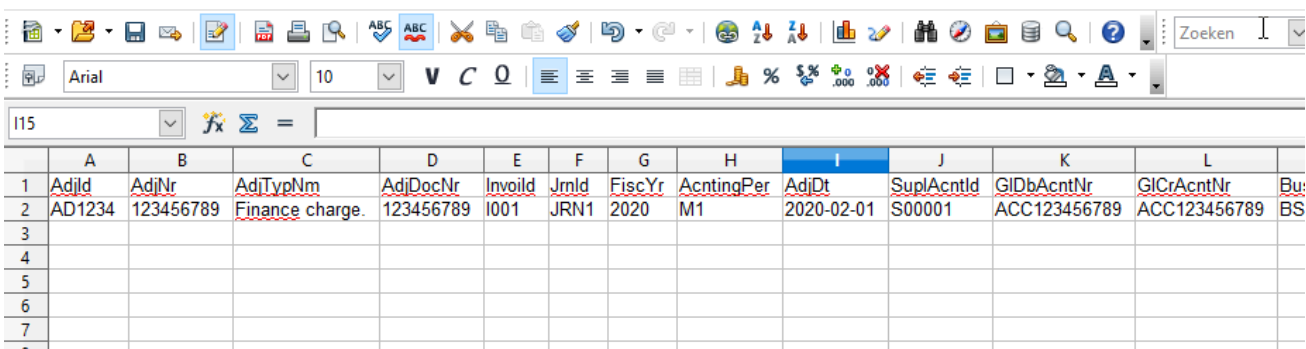
For CSV validation there exists a Schema language:

[CSV Schema Language 1.1 \(digital-preservation.github.io\)](https://digital-preservation.github.io/csv-schema-language-1.1/)

However this is an unofficial draft.

4.4.4 CSV Sample

In the following (part of) example there's one table with one line in one CSV file, presented by OpenOfficeCalc:



| | A | B | C | D | E | F | G | H | I | J | K | L | |
|---|--------|-----------|----------------|-----------|--------|------|--------|------------|------------|------------|--------------|--------------|----|
| 1 | AdjId | AdjNr | AdjTypNm | AdjDocNr | InvoId | Jmld | FiscYr | AcntingPer | AdjDt | SuplAcntId | GlDbAcntNr | GlCrAcntNr | Bu |
| 2 | AD1234 | 123456789 | Finance charge | 123456789 | I001 | JRN1 | 2020 | M1 | 2020-02-01 | S00001 | ACC123456789 | ACC123456789 | BS |
| 3 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |

4.5 Mapping ISO 21378-2019 ADCS Tables to XML and JSON

To convert ISO 21378-2019 ADCS Tables to XML and JSON or vice versa, a mapping table per ISO 21378-2019 ADCS Table must be set up. So 71 mapping tables must be created. The next chapter shows an example of such a table.

4.5.1 Mapping Table sample

Mapping ISO 21378:2019 Table to XML and JSON and vice versa.

Table : AP_Adjustments
Version: : 1.0
XML-Schema : AdcApAdjustments-v1.0.xsd
JSON-Schema : AdcApAdjustments_jsd6-v1.0.json
Roottag : AdcApAdjustments
Table tag : ApAdj
Path : AdcApAdjustments.ApAdj."XML / JSON Tag"

| No. | Name | Data-type | XML / JSON Tag |
|-----|--------------------------------|-----------|------------------|
| 1 | Adjustment_ID | String | AdjId |
| 2 | Adjustment_Number | String | AdjNr |
| 3 | Adjustment_Type_Name | String | AdjTypNm |
| 4 | Adjustment_Document_Number | String | AdjDocNr |
| 5 | Invoice_ID | String | InvoiId |
| 6 | Journal_ID | String | JrnId |
| 7 | Fiscal_Year | String | FiscYr |
| 8 | Accounting_Period | String | AcntingPer |
| 9 | Adjustment_Date | Date | AdjDt |
| 10 | Supplier_Account_ID | String | SuplAcntId |
| 11 | Adjustment_Functional_Amount | Decimal | AdjAmt.FuncAmt |
| 12 | ADJ_Functional_CUR_Code | String | AdjAmt.FuncCurCd |
| 13 | ADJ_Transaction_Amount | Decimal | AdjAmt.TrAmt |
| 14 | ADJ_TRX_CUR_Code | String | AdjAmt.TrCurCd |
| 15 | Adjustment_Reporting_Amount | Decimal | AdjAmt.RprtAmt |
| 16 | Adjustment_Reporting_CUR_Code | String | AdjAmt.RprtCurCd |
| 17 | Adjustment_Local_Amount | Decimal | AdjAmt.LocAmt |
| 18 | Adjustment_Local_Currency_Code | String | AdjAmt.LocCurCd |
| 19 | Created_User_ID | String | Crea.UserId |
| 20 | Created_Date | Date | Crea.Dt |
| 21 | Created_Time | Time | Crea.Tm |
| 22 | Approved_User_ID | String | Aprv.UserId |
| 23 | Approved_Date | Date | Aprv.Dt |
| 24 | Approved_Time | Time | Aprv.Tm |

| | | | |
|----|-------------------------------|---------|----------------------|
| 25 | Last_Modified_User_ID | String | LstMdf.UserId |
| 26 | Last_Modified_Date | Date | LstMdf.Dt |
| 27 | Last_Modified_Time | Time | LstMdf.Tm |
| 28 | Tax1_Type_Code | String | Tax(1).TaxTypCd |
| 29 | Tax1_Local_Amount | Decimal | Tax(1).TaxLocAmt |
| 30 | Tax2_Type_Code | String | Tax(2).TaxTypCd |
| 31 | Tax2_Local_Amount | Decimal | Tax(2).TaxLocAmt |
| 32 | Tax3_Type_Code | String | Tax(3).TaxTypCd |
| 33 | Tax3_Local_Amount | Decimal | Tax(3).TaxLocAmt |
| 34 | Tax4_Type_Code | String | Tax(4).TaxTypCd |
| 35 | Tax4_Local_Amount | Decimal | Tax(4).TaxLocAmt |
| 36 | GL_Debit_Account_Number | String | GLDbAcntNr |
| 37 | GL_Credit_Account_Number | String | GLCrAcntNr |
| 38 | GL_Tax1_Debit_Account_Number | String | Tax(1).GLTaxDbAcntNr |
| 39 | GL_Tax1_Credit_Account_Number | String | Tax(1).GLTaxCrAcntNr |
| 40 | GL_Tax2_Debit_Account_Number | String | Tax(2).GLTaxDbAcntNr |
| 41 | GL_Tax2_Credit_Account_Number | String | Tax(2).GLTaxCrAcntNr |
| 42 | GL_Tax3_Debit_Account_Number | String | Tax(3).GLTaxDbAcntNr |
| 43 | GL_Tax3_Credit_Account_Number | String | Tax(3).GLTaxCrAcntNr |
| 44 | GL_Tax4_Debit_Account_Number | String | Tax(4).GLTaxDbAcntNr |
| 45 | GL_Tax4_Credit_Account_Number | String | Tax(4).GLTaxCrAcntNr |
| 46 | Business_Segment_X | String | BusSgX |

4.6 Cross topics

4.6.1 General

In addition to the technical part, different data formats face the same problems, which are management level, such as encryption of sensitive data.

4.6.2 Character encoding conventions

The character encoding used in ADCS was developed to be system and language agnostic (cross platform and cross-language). It is recommended that the two parties exchanging files adopt the UTF-8 format defined by the Unicode encoding system in the absence of a clear agreement to use a different format. UTF-8 can encode most characters and is supported by many application systems. It also has been widely applied in many fields and is usually used as the default format for data exchange. In cases where uncommon characters are encountered, UTF-8 may not have the capability to fully encode the format, which can have an impact in a particular data acquisition scenario. Special agreements may be carried out in accordance with specific business practices. Examples:

ASCII may be used in English, Chinese national standard 18030 may be used in China.

ISO/IEC 8859-1 may be used in Western European languages.

4.6.3 Versioning

Versioning has two primary aspects.

- a) Versioning of the definitions: Because the ADCS may evolve, it is important to identify the set of standards with which the extract file is compliant to avoid confusion when time flies and to increase the value of the audit data collection, particularly when an archived file set is leveraged for additional processing.
- b) Versioning of data extracts: It is common for an organization to re-extract data for a specific task and period of time. An initial draft should be performed for testing purposes before the data are complete. This will help mitigate errors, omissions or other issues that may require re-extracting the data. It is therefore important to be able to easily differentiate between files extracted using the different versions of the standard. In addition, it is also important to have the ability to distinguish later extracts that replace or augment an original extract.

Over time, the standard may need to be refreshed to capture the types of changes referenced above. For delimited text files, the file name is the primary tool for capturing these differences.

4.6.4 Multi-platform and multi-system data transfer

Different platforms, operating systems and file systems are likely to have an impact on file transfer.

Different file systems support different file sizes. For example, the maximum file size of the NTFS file system (in Windows) is 2 TB (terabytes), the maximum file size of the Fat32 file system (in Windows) is 4 GB (gigabytes), the maximum file size of the Ext2 file system (in Linux) is 16 GB, and the maximum file size of the Ext4 file system (in Linux) is 16 TB. If the auditor's and the auditee's file structures are different, direct data transfer can produce errors.

To ensure the efficiency and accuracy of data transfer, some suggestions are as follows.

- a) Considering the minimum system requirement, the limit of a single file size is 4 GB. Single files greater than 4 GB should be split into smaller files. Three-digit Arabic numerals should be added at the end of the filename to express the file order.

EXAMPLE xxx_001.csv and xxx_002.csv.

- b) When the transfer mode is binary conversion, files shall be transferred without modification.

EXAMPLE Changing the encoding to convert “\n” to “\r\n” while transferring files can corrupt the file and render it unreadable.

4.6.5 Reduce file size (TBD)

Reducing file sizes means representing a source file with less bits, which can improve the data transfer efficiency and reduce storage consumption, and is useful in data transmission and storage.

When the file exceeds a maximum size (for instance 100,000 lines) the file must be split into several files, each not exceeding the maximum number of lines. The sequence number of the file is expressed in the file name, see chapter 4.6.7.

4.6.6 File Compression (TBD)

If files are still too large to handle, it can be decided to prescribe file compression. In general, a compressed XML file is only 10% of its uncompressed size.

4.6.7 Conventions of folder naming and file naming (TBD)

Because of the large number of files that can be involved in an extraction, naming conventions for folders and files are important. The conventions make files more easily distinguished from one another and easier to browse and identify. In the case of the ADCS, the following usage scenarios should be considered:

- a) the organization of an auditee's files includes versions of files in a single data collection process or multiple data collections processes.
- b) the differentiation of files across multiple auditees.

To satisfy the above scenarios, some information could be built into the directory structure, filenames or both.

The folder-naming conventions and some examples are shown in the next table:

Table — Folder-naming conventions and examples

| Type of information | Information example | Folder-naming examples |
|---------------------|---------------------------------------|--|
| Company | <Widget, Inc> | Widget, Inc_Retail_CHN_2018_ADCS_GL_1to9 |
| Division | <Retail>, <Manufacturing>, <Purchase> | |
| Country Code | <USA>, <CHN>, <NL>, <23> | |
| Year | <2018> | |
| Standard | <ADCS> | |
| Module | <GL>, <INV> | |
| Periods | <Jan-Aug>, <1to9> | |

The file-naming conventions and some examples are showed in the next table:

Table — File-naming conventions and examples

| Type of information | Information examples | File-naming examples |
|-----------------------------|------------------------------|---|
| Standard name | <ADCS> | ADCS_7_2018_Widget, Inc_INV_INV_Location_20181108_1of1_000 23.xml |
| Period end extracted | <October>, <7> | |
| Year extracted | <2018>, <19> | |
| Company | <Widget, Inc> | |
| Module | <GL>, <INV> | |
| Table name | <SAL_Orders>, <INV_Location> | |
| Extraction date | <20181108> | |
| Extracted table piece count | <1of1>, <2of7>, <3of7> | |
| Extraction unique ID | <EID00001>, <XID1>, <00023> | |
| Extension | <xml>, <json>, <csv>, <txt> | |

4.6.8 Representation of special field types

Although the field types are defined in the data model, it is useful to explain some general types in this document:

Format of Date fields: CCYY-MM-DD (f.i. 2020-03-30)

Format of Time fields: HH:MM (f.i. 20:30)

Format of Amounts, Prices, Percentages: Will have a maximum number of digits, and a number of decimals. These fields always need to be written with the required number of decimals defined and a decimal point. (f.i. 100.25).

Format of Boolean: Value can be 0, 1, false, true.

Percentage fields contain 1/100 percentage. For instance 6% must be written as "0.06" in the exchanged files.

4.6.9 Extension mechanism

This chapter will give the solution how to add additional tables, fields and code lists.

It is not allowed to add own data elements into an ADC file.

Extensions will be modelled as separate tables that are linked to the ADCS tables by using primary – foreign key relationships. Extensions, after proven to be successful, can be input to the ADCS maintenance process. In this process data elements defined in the extension may be moved to the original ADCS table in a new version of the standard.

Extensions and new data elements must be requested from the ISO TC 295 organization.

4.6.10 Encryption of sensible data (TBD)

Audit data is the company's business data rather than public data, which needs privacy protection, especially the sensible data involving personal information. Therefore, the privacy protection of sensitive data is an important part of audit data collection. Data encryption is an important means to protect private data, this module is mainly about how to encrypt the sensible data.

Annex A

XML Tags abbreviation List

| | | | |
|---|----|---------------|--------|
| 1 | 1 | Abbreviation | Abrv |
| 1 | 2 | Academic | Acad |
| 1 | 3 | Account | Acnt |
| 1 | 4 | Accrual | Accrl |
| 1 | 5 | Accumulated | Accum |
| 1 | 6 | Acquisition | Acq |
| 1 | 7 | Addition | Add |
| 1 | 8 | Address | Adr |
| 1 | 9 | Adjusted | Adjd |
| 1 | 10 | Adjustment | Adj |
| 1 | 11 | After | Aft |
| 1 | 12 | Allocation | Alloc |
| 1 | 13 | Amount | Amt |
| 1 | 14 | Application | Apl |
| 1 | 15 | Approved | Aprv |
| 1 | 16 | Balance | Bal |
| 1 | 17 | Before | Bef |
| 1 | 18 | Beginning | Beg |
| 1 | 19 | Billing | Bil |
| 1 | 20 | Branch | Bra |
| 1 | 21 | Business | Bus |
| 1 | 22 | Cancellation | Cncl |
| 1 | 23 | Change | Chng |
| 1 | 24 | Code | Cd |
| 1 | 25 | Contact | Cnt |
| 1 | 26 | Content | Cont |
| 1 | 27 | Contract | Contr |
| 1 | 28 | Corresponding | Corr |
| 1 | 29 | Costing | Cstng |
| 1 | 30 | Country | Cntry |
| 1 | 31 | Created | Crea |
| 1 | 32 | Credit | Cr |
| 1 | 33 | Currency | Cur |
| 1 | 34 | Customer | Cust |
| 1 | 35 | Customized | Cstmzd |

| | | | |
|---|----|--------------|---------|
| 1 | 36 | Date | Dt |
| 1 | 37 | Debit | Db |
| 1 | 38 | Default | Dft |
| 1 | 39 | Department | Dep |
| 1 | 40 | Depreciable | Dprcbl |
| 1 | 41 | Depreciation | Depre |
| 1 | 42 | Description | Dscr |
| 1 | 43 | Details | Dtls |
| 1 | 44 | Developer | Dvlpr |
| 1 | 45 | Discount | Dscnt |
| 1 | 46 | Dispatch | Disp |
| 1 | 47 | Document | Doc |
| 1 | 48 | Employee | Emp |
| 1 | 49 | Employment | Emplmnt |
| 1 | 50 | Encoding | Enc |
| 1 | 51 | Ending | End |
| 1 | 52 | Exclude | Excl |
| 1 | 53 | Expense | Expns |
| 1 | 54 | External | Ext |
| 1 | 55 | Fiscal | Fisc |
| 1 | 56 | Fiscal | Fscl |
| 1 | 57 | Functional | Func |
| 1 | 58 | Generated | Gen |
| 1 | 59 | Grouping | Grp |
| 1 | 60 | Header | Hdr |
| 1 | 61 | Hierarchy | Hrchy |
| 1 | 62 | Identifier | Id |
| 1 | 63 | Impairment | Impr |
| 1 | 64 | Include | Incl |
| 1 | 65 | Indicator | Ind |
| 1 | 66 | Inventory | Inv |
| 1 | 67 | Invoice | Invoi |
| 1 | 68 | Journal | Jrn |
| 1 | 69 | Last | Lst |
| 1 | 70 | Line | Ln |
| 1 | 71 | Local | Loc |
| 1 | 72 | Location | Lct |
| 1 | 73 | Materials | Mat |
| 1 | 74 | Measurement | Mea |
| 1 | 75 | Method | Mthd |

| | | | |
|---|-----|--------------|---------|
| 1 | 76 | Modified | Mdf |
| 1 | 77 | Module | Mod |
| 1 | 78 | Name | Nm |
| 1 | 79 | Number | Nr |
| 1 | 80 | Open | Opn |
| 1 | 81 | Order | Ord |
| 1 | 82 | Organization | Org |
| 1 | 83 | Parent | Par |
| 1 | 84 | Payable | Pbl |
| 1 | 85 | Payment | Pay |
| 1 | 86 | Percentage | Perc |
| 1 | 87 | Period | Per |
| 1 | 88 | Person | Prsn |
| 1 | 89 | Physical | Phys |
| 1 | 90 | Primary | Prim |
| 1 | 91 | Proceeds | Prcds |
| 1 | 92 | Process | Proc |
| 1 | 93 | Product | Prdct |
| 1 | 94 | Project | Proj |
| 1 | 95 | Proportion | Prop |
| 1 | 96 | Province | Prvnc |
| 1 | 97 | Provision | Prov |
| 1 | 98 | Purchase | Pur |
| 1 | 99 | Purchasing | Prchsng |
| 1 | 100 | Quantity | Qt |
| 1 | 101 | Realized | Rlzd |
| 1 | 102 | Receipt | Rcpt |
| 1 | 103 | Receivable | Rcvbl |
| 1 | 104 | Received | Rcvd |
| 1 | 105 | Records | Rec |
| 1 | 106 | Reference | Ref |
| 1 | 107 | Regulator | Rgltr |
| 1 | 108 | Remaining | Rmng |
| 1 | 109 | Remark | Rmrk |
| 1 | 110 | Removal | Rmv |
| 1 | 111 | Replacemant | Replac |
| 1 | 112 | Replacement | Rplc |
| 1 | 113 | Reporting | Rprt |
| 1 | 114 | Requisition | Rqstn |
| 1 | 115 | Residual | Resi |

| | | | |
|---|-----|----------------|--------|
| 1 | 116 | Responsibility | Resp |
| 1 | 117 | Reversal | Rev |
| 1 | 118 | Sales | Sal |
| 1 | 119 | Segment | Sg |
| 1 | 120 | Service | Srvc |
| 1 | 121 | Settlement | Setl |
| 1 | 122 | Sheet | Sht |
| 1 | 123 | Shipment | Shp |
| 1 | 124 | Shipping | Shpng |
| 1 | 125 | Software | Sftw |
| 1 | 126 | Source | Src |
| 1 | 127 | Standard | Std |
| 1 | 128 | Status | Stat |
| 1 | 129 | Stocking | Stck |
| 1 | 130 | Subledger | Sbldgr |
| 1 | 131 | Supplier | Supl |
| 1 | 132 | System | Syst |
| 1 | 133 | Terms | Trms |
| 1 | 134 | Time | Tm |
| 1 | 135 | Total | Tot |
| 1 | 136 | Transaction | Tr |
| 1 | 137 | Type | Typ |
| 1 | 138 | Unrealized | Unrlzd |
| 1 | 139 | Version | Vers |
| 1 | 140 | Year | Yr |

Annex B

List of XML Schema's

AdcBasAccountingPeriod-v1.0.xsd

AdcBasBankAccount-v1.0.xsd

AdcBasBillType-v1.0.xsd

AdcBasBusinessSegment-v1.0.xsd

AdcBasBusinessSegmentHierarchy-v1.0.xsd

AdcBasChartOfAccounts-v1.0.xsd

AdcBasCurrency-v1.0.xsd

AdcBasCustomer-v1.0.xsd

AdcBasCustomerType-v1.0.xsd

AdcBasCustomizedAccSegment-v1.0.xsd

AdcBasCustomizedAccValue-v1.0.xsd

AdcBasEmployee-v1.0.xsd

AdcBasJournalEntryType-v1.0.xsd

AdcBasMeasurementUnit-v1.0.xsd

AdcBasPaymentTerm-v1.0.xsd

AdcBasProfile-v1.0.xsd

AdcBasProject-v1.0.xsd

AdcBasSettlementMethod-v1.0.xsd

AdcBasSupplier-v1.0.xsd

AdcBasSupplierType-v1.0.xsd

AdcBasTaxRegulatory-v1.0.xsd

AdcBasTaxType-v1.0.xsd

AdcBasUser-v1.0.xsd

AdcGlAccountSegment-v1.0.xsd

AdcGlAccountsPeriodBalance-v1.0.xsd

AdcGldetails-v1.0.xsd
AdcGlSource-v1.0.xsd
AdcGlTrialBalance-v1.0.xsd
AdcArAdjustments-v1.0.xsd
AdcArAdjustmentsDetails-v1.0.xsd
AdcArCashApplication-v1.0.xsd
AdcArCashReceived-v1.0.xsd
AdcArOpenAccountsReceivable-v1.0.xsd
AdcSalContracts-v1.0.xsd
AdcSalContractsDetails-v1.0.xsd
AdcSalInvoicesGenerated-v1.0.xsd
AdcSalInvoicesGeneratedDetails-v1.0.xsd
AdcSalOrders-v1.0.xsd
AdcSalOrdersDetails-v1.0.xsd
AdcSalShipmentsMade-v1.0.xsd
AdcSalShipmentsMadeDetails-v1.0.xsd
AdcApAdjustments-v1.0.xsd
AdcApAdjustmentsDetails-v1.0.xsd
AdcApCashApplication-v1.0.xsd
AdcApOpenAccountsPayable-v1.0.xsd
AdcApPaymentsMade-v1.0.xsd
AdcPurContracts-v1.0.xsd
AdcPurContractsDetails-v1.0.xsd
AdcPurInvoicesReceived-v1.0.xsd
AdcPurInvoicesReceivedDetails-v1.0.xsd
AdcPurMaterialsReceived-v1.0.xsd
AdcPurMaterialsReceivedDetails-v1.0.xsd
AdcPurOrders-v1.0.xsd

AdcPurOrdersDetails-v1.0.xsd

AdcPurRequisitions-v1.0.xsd

AdcPurRequisitionsDetails-v1.0.xsd

AdcInvLocation-v1.0.xsd

AdcInvOnHand-v1.0.xsd

AdcInvPeriodBalance-v1.0.xsd

AdcInvPhysicalInventory-v1.0.xsd

AdcInvProduct-v1.0.xsd

AdcInvProductType-v1.0.xsd

AdcInvTransaction-v1.0.xsd

AdcPpeAddition-v1.0.xsd

AdcPpeChange-v1.0.xsd

AdcPpeDepartmentAllocation-v1.0.xsd

AdcPpeDepreciation-v1.0.xsd

AdcPpeDepreciationMethod-v1.0.xsd

AdcPpeMaster-v1.0.xsd

AdcPpeRemoval-v1.0.xsd

AdcPpeType-v1.0.xsd

Annex C

List of JSON Schema's

AdcBasAccountingPeriod_jsd6-v1.0.json
AdcBasBankAccount_jsd6-v1.0.json
AdcBasBillType_jsd6-v1.0.json
AdcBasBusinessSegment_jsd6-v1.0.json
AdcBasBusinessSegmentHierarchy_jsd6-v1.0.json
AdcBasChartOfAccounts_jsd6-v1.0.json
AdcBasCurrency_jsd6-v1.0.json
AdcBasCustomer_jsd6-v1.0.json
AdcBasCustomerType_jsd6-v1.0.json
AdcBasCustomizedAccSegment_jsd6-v1.0.json
AdcBasCustomizedAccValue_jsd6-v1.0.json
AdcBasEmployee_jsd6-v1.0.json
AdcBasJournalEntryType_jsd6-v1.0.json
AdcBasMeasurementUnit_jsd6-v1.0.json
AdcBasPaymentTerm_jsd6-v1.0.json
AdcBasProfile_jsd6-v1.0.json
AdcBasProject_jsd6-v1.0.json
AdcBasSettlementMethod_jsd6-v1.0.json
AdcBasSupplier_jsd6-v1.0.json
AdcBasSupplierType_jsd6-v1.0.json
AdcBasTaxRegulatory_jsd6-v1.0.json
AdcBasTaxType_jsd6-v1.0.json
AdcBasUser_jsd6-v1.0.json
AdcGlAccountSegment_jsd6-v1.0.json
AdcGlAccountsPeriodBalance_jsd6-v1.0.json

AdcGlDetails_jsd6-v1.0.json
AdcGlSource_jsd6-v1.0.json
AdcGlTrialBalance_jsd6-v1.0.json
AdcArAdjustments_jsd6-v1.0.json
AdcArAdjustmentsDetails_jsd6-v1.0.json
AdcArCashApplication_jsd6-v1.0.json
AdcArCashReceived_jsd6-v1.0.json
AdcArOpenAccountsReceivable_jsd6-v1.0.json
AdcSalContracts_jsd6-v1.0.json
AdcSalContractsDetails_jsd6-v1.0.json
AdcSalInvoicesGenerated_jsd6-v1.0.json
AdcSalInvoicesGeneratedDetails_jsd6-v1.0.json
AdcSalOrders_jsd6-v1.0.json
AdcSalOrdersDetails_jsd6-v1.0.json
AdcSalShipmentsMade_jsd6-v1.0.json
AdcSalShipmentsMadeDetails_jsd6-v1.0.json
AdcApAdjustments_jsd6-v1.0.json
AdcApAdjustmentsDetails_jsd6-v1.0.json
AdcApCashApplication_jsd6-v1.0.json
AdcApOpenAccountsPayable_jsd6-v1.0.json
AdcApPaymentsMade_jsd6-v1.0.json
AdcPurContracts_jsd6-v1.0.json
AdcPurContractsDetails_jsd6-v1.0.json
AdcPurInvoicesReceived_jsd6-v1.0.json
AdcPurInvoicesReceivedDetails_jsd6-v1.0.json
AdcPurMaterialsReceived_jsd6-v1.0.json
AdcPurMaterialsReceivedDetails_jsd6-v1.0.json
AdcPurOrders_jsd6-v1.0.json

AdcPurOrdersDetails_jsd6-v1.0.json
AdcPurRequisitions_jsd6-v1.0.json
AdcPurRequisitionsDetails_jsd6-v1.0.json
AdcInvLocation_jsd6-v1.0.json
AdcInvOnHand_jsd6-v1.0.json
AdcInvPeriodBalance_jsd6-v1.0.json
AdcInvPhysicalInventory_jsd6-v1.0.json
AdcInvProduct_jsd6-v1.0.json
AdcInvProductType_jsd6-v1.0.json
AdcInvTransaction_jsd6-v1.0.json
AdcPpeAddition_jsd6-v1.0.json
AdcPpeChange_jsd6-v1.0.json
AdcPpeDepartmentAllocation_jsd6-v1.0.json
AdcPpeDepreciation_jsd6-v1.0.json
AdcPpeDepreciationMethod_jsd6-v1.0.json
AdcPpeMaster_jsd6-v1.0.json
AdcPpeRemoval_jsd6-v1.0.json
AdcPpeType_jsd6-v1.0.json

Bibliography

- [1]. REC-xml-19980210 Extensible Markup Language (XML) 1.0 W3C Recommendation 10-February-1998,
- [2]. XML Schema 1.1 Part 1: Structures
- [3]. XML Schema 1.1 Part 2: Datatypes
- [4]. RFC4627 The application/json Media Type for JavaScript Object Notation (JSON)
- [5]. JSON Schema definition specifications on: <https://json-schema.org/specification-links.html>
- [6]. RFC 4180, Common Format and MIME Type for Comma-Separated Values (CSV) Files

Etc. etc....