



Guide to Schematron Rules and Patterns

ITS-MS Schematron Guide

Version 2015-FEBr2018-JUL

December 1, 2022

Distribution Notice:

This document has been approved for Public Release and is available for use without restriction.

Table of Contents

Chapter 1 - Introduction	1
1.1 - Purpose	1
1.2 - Overview	1
1.3 - Schematron	1
1.4 - Conformance	1
Chapter 2 - Rules	2
2.1 - ../Rules/GeneralConstraints/ITS-MS_ID_00001.sch	3
2.2 - ../Rules/GeneralConstraints/ITS-MS_ID_00002.sch	4
2.3 - ../Rules/GeneralConstraints/ITS-MS_ID_00003.sch	5
Chapter 3 - Abstract Patterns	6
Chapter 4 - Schematron Schema	7
4.1 - ../ITS-MS_XML.sch	8
Chapter 5 - Removed Rules	9

Chapter 1 - Introduction

1.1 - Purpose

This is an informative supplement for ITS-MS. This guide is generated from the ITS-MS Schematron rules and provides a consolidated reference for the business rules of this specification.

1.2 - Overview

Chapter 2 is a listing of all the numbered rules in ITS-MS. For each rule, there is a rule description, a code description, and a code block with the Schematron rule.

Chapter 3 is a listing of abstract patterns used in ITS-MS. The abstract patterns may be used in numbered rules or provided as reference for use in rules developed by users of ITS-MS. Each abstract pattern has a code description and a code block with the abstract Schematron pattern.

Chapter 4 is a listing of the master ITS-MS Schematron file with all of the imports of rules and patterns. Many of the rules and patterns listed in Chapters 3 and 4 rely on functions and variables defined in the master file.

Chapter 5 is a listing of rules that have been deleted.

1.3 - Schematron

The business rules for ITS-MS are encoded using ISO Schematron. Schematron is a rule-based validation language that uses XML Path Language to make assertions about an XML document.

ITS-MS uses the XSLT 2.0 implementation of Schematron by Rick Jelliffe (2010-04-14) as its reference implementation. The only available identifying descriptors for this implementation are the implementer's name and date of release. This implementation may be found at the following URL: <http://code.google.com/p/schematron/>.



Important

The Schematron rules in this specification use XSLT 2.0 query binding.

1.4 - Conformance

This guide is informative. The Schematron rules listed here are normative in the sense that they convey criteria that a document **MUST** adhere to, exactly as English may be used to convey normative criteria. It is not necessary for implementers to use the specific Schematron encoding in this specification. Implementers **MAY** use any encodings, tools, or languages desired to implement validation schemes for conformance to this specification. However, to conform to the specification, validation schemes **MUST** match the behavior of the reference Schematron implementation. That is, a validator **MUST** find a document valid *if and only if* the reference Schematron implementation would find the document valid according to ITS-MS's Schematron rules.

Chapter 2 - Rules

All of the numbered Rules for ITS-MS are listed in this section. These rules may depend on patterns defined in the Abstract Patterns section or on variables defined in the Schematron Schema section.

Rules identifiers are all of the format ITS-MS-ID-XXXXX, with rule files named ITS-MS_ID_XXXXX.sch. Any other heading indicates a supporting file that may influence a rule but is not actually a numbered rule.

2.1 - ../Rules/GeneralConstraints/ITS-MS_ID_00001.sch

Rule Description

[ITS-MS-ID-00001][Error] The @ism:DESVersion is less than the minimum version allowed: 2014-DEC (201412). Human Readable: The ISM version imported by ITS-MS must be greater than or equal to 2014-DEC (201412).

Code Description

For all elements that contain @ism:DESVersion, this rule verifies that the version is greater than or equal to the minimum allowed version: 2014-DEC (201412).

Schematron Code

```
<?ICEA pattern?>
<!-- Notices - Distribution Notice:
      This document has been approved for Public Release and is available for use without restriction.
-->

<sch:pattern id="ITS-MS-ID-00001">
    <sch:rule id="ITS-MS-ID-00001-R1" context="*[@ism:DESVersion]">
        <sch:let name="version"
            value="number(if (contains(@ism:DESVersion,'-')) then substring-before(@ism:DESVersion,'-') else @ism:DESVersion)"/>
        <sch:assert test="$version >= 201412" flag="error" role="error">[ITS-MS-ID-00001][Error] The @ism:DESVersion
    <sch:value-of select="./@ism:DESVersion"/>is less than the minimum version allowed: 2014-DEC (201412). Human Readable: The ISM version imported by ITS-MS must be greater than or equal to
2014-DEC (201412).
    </sch:assert>
    </sch:rule>
</sch:pattern>
```

2.2 - ../Rules/GeneralConstraints/ITS-MS_ID_00002.sch

Rule Description

[ITS-MS-ID-00002][Warning] DESVersion attributes SHOULD be specified as revision 201502.201807 with an optional extension.

Code Description

This rule supports extending the version identifier with an optional trailing hyphen and up to 23 additional characters. The version must match the regular expression “^201502.201807(-.{1,23})?\$”.

Schematron Code

```
<?ICEA pattern?>
<!-- Notices - Distribution Notice:
      This document has been approved for Public Release and is available for use without restriction.
-->

<sch:pattern id="ITS-MS-ID-00002">
    <sch:rule id="ITS-MS-ID-00002-R1" context="*[@DESVersion]">
        <sch:assert test="matches(@DESVersion, '^201502.201807(-.{1,23})?$' )"
            flag="warning"
            role="warning">[ITS-MS-ID-00002][Warning] DESVersion attributes found was "
        <sch:value-of select="@DESVersion"/>" it SHOULD be specified as revision 201502.201807 with an optional extension.
    </sch:assert>
    </sch:rule>
</sch:pattern>
```

2.3 - ../Rules/GeneralConstraints/ITS-MS_ID_00003.sch

Rule Description

[ITS-MS-ID-00003][Error] The @tdf:version is less than the minimum version allowed: 2014-DEC (201412). Human Readable: The IC-TDF version imported by ITS-MS must be greater than or equal to 2014-DEC (201412).

Code Description

For all elements that contain @tdf:version, this rule verifies that the version is greater than or equal to the minimum allowed version: 2014-DEC (201412).

Schematron Code

```
<?ICEA pattern?>
<!-- Notices - Distribution Notice:
      This document has been approved for Public Release and is available for use without restriction.
-->

<sch:pattern id="ITS-MS-ID-00003">
    <sch:rule id="ITS-MS-ID-00003-R1" context="*[@tdf:version]">
        <sch:let name="version"
            value="number(if (contains(@tdf:version,'-')) then substring-before(@tdf:version,'-') else @tdf:version)"/>
        <sch:assert test="$version >= 201412" flag="error" role="error">[ITS-MS-ID-00003][Error] The @tdf:version
    <sch:value-of select="./@tdf:version"/>is less than the minimum version allowed: 2014-DEC (201412). Human Readable: The IC-TDF version imported by ITS-MS must be greater than or equal to
2014-DEC (201412).
    </sch:assert>
    </sch:rule>
</sch:pattern>
```


Chapter 3 - Abstract Patterns

There are no Abstract Patterns currently defined for ITS-MS.

Chapter 4 - Schematron Schema

The top level Schematron file for ITS-MS is in this section. This file imports all of the others and also defines many global variables they are all dependent on.

4.1 - ../ITS-MS_XML.sch

Schematron Code

```
<!--UNCLASSIFIED-->
<?ICEA master?>
<!-- Notices - Distribution Notice:
      This document has been approved for Public Release and is available for use without restriction.
-->
<!-- WARNING:
      Once compiled into an XSLT the result will
      be the aggregate classification of all the CVES
      and included .sch files
-->

<sch:schema queryBinding="xslt2">
    <sch:ns uri="http://www.w3.org/1999/xlink" prefix="xlink"/>
    <sch:ns uri="http://www.w3.org/2001/XMLSchema" prefix="xs"/>
    <sch:ns uri="urn:us:gov:ic:tdf" prefix="tdf"/>
    <sch:ns uri="urn:us:gov:ic:ism" prefix="ism"/>
    <sch:ns uri="urn:us:gov:ic:its" prefix="its"/>
    <!--*****-->
<!-- (U) ITS-MS ID Rules -->
<!--*****-->
<!--(U) GeneralConstraints-->

<sch:include href="../Rules/GeneralConstraints/ITS-MS_ID_00001.sch"/>
    <sch:include href="../Rules/GeneralConstraints/ITS-MS_ID_00002.sch"/>
    <sch:include href="../Rules/GeneralConstraints/ITS-MS_ID_00003.sch"/>
    <!--*****-->
<!-- (U) ITS-MS Phases -->
<!--*****-->
</sch:schema>

<!--UNCLASSIFIED-->
```

Chapter 5 - Removed Rules

There are no rules that have been removed for ITS-MS.