

# Date and time — Codes for calendar systems

Working Draft Standard

## **Warning for drafts**

This document is not a CalConnect Standard. It is distributed for review and comment, and is subject to change without notice and may not be referred to as a 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.

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.

The Calendaring and Scheduling Consortium, Inc. 2019

:2019

© 2019 The Calendaring and Scheduling Consortium, Inc.

All rights reserved. Unless otherwise specified, 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 the address below.

The Calendaring and Scheduling Consortium, Inc.

4390 Chaffin Lane  
McKinleyville  
California 95519  
United States of America

[copyright@calconnect.org](mailto:copyright@calconnect.org)  
[www.calconnect.org](http://www.calconnect.org)

# Contents

|   |    |
|---|----|
| Foreword.....   | iv |
| Introduction.....   | v  |
| 1. Normative references.....  | 1  |
| 2. Terms and definitions.....   | 1  |
| 3. Calendar system models overview.....   | 2  |
| 4. Data types.....  | 2  |
| 4.1. Core data types.....   | 2  |
| 4.2. Common data types.....   | 2  |
| 4.3. iso15924Code.....  | 2  |
| 4.4. iso639Code.....  | 3  |
| 4.5. LocalizedTag.....  | 3  |
| 4.6. LocalizedString.....   | 3  |
| 4.7. JulianDate.....  | 3  |
| 4.8. CalendarDate.....  | 3  |
| 5. Data models.....   | 4  |
| 5.1. CalendarSystem.....  | 4  |
| 5.2. CalendarEra.....   | 5  |
| 6. Codes and identifiers.....   | 5  |
| 6.1. Requirements.....  | 5  |
| 6.2. Principles for allocation of code elements.....                                  | 6  |
| 6.3. List of calendar system and their code elements.....                             | 6  |
| Appendix A (normative) Registration.....  | 7  |
| A.1. Registration authority (ISO 34300/RA).....                                       | 7  |
| A.2. Advisory group (ISO 34300/AG).....   | 7  |
| A.3. Operations on list of calendar systems and calendar eras and their codes.....    | 7  |
| A.4. Removal from the list of calendar system and calendar era codes.....             | 8  |
| A.5. Removal of elements from the list of calendar system and calendar era codes..... | 8  |
| A.6. Alterations to elements on list of calendar system and calendar era codes.....   | 8  |
| A.7. Reservation of code elements.....  | 8  |
| A.8. Advice regarding use of code elements.....                                       | 9  |
| Bibliography.....   | 10 |

## Foreword

The Calendaring and Scheduling Consortium (“CalConnect”) is a global non-profit organization with the aim to facilitate interoperability of collaborative technologies and tools through open standards.

CalConnect works closely with international and regional partners, of which the full list is available on our website ( <https://www.calconnect.org/about/liaisons-and-relationships>).

The procedures used to develop this document and those intended for its further maintenance are described in the CalConnect Directives.

In particular the different approval criteria needed for the different types of CalConnect documents should be noted. This document was drafted in accordance with the editorial rules of the CalConnect Directives.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CalConnect 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 provided in the Introduction.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

This document was prepared by Technical Committee *DATETIME*.

## Introduction

Calendar systems are essential to the tracking of dates and events.

Date and time tracking applications, such as in computing, archiving, communication and bibliography, all depend on the accurate identification of calendar systems for their performance. Moreover, accuracy of date and time tracking is often paramount to important activities from civilian to military use.

This document describes methods to unambiguously define calendar systems, their properties, and provides a mechanism to assign unique identifiers to these data elements.

This document also sets out the necessary procedures to maintain an international registry of calendar systems. == Scope

This document provides a list of codes to represent calendar systems, metadata to support the usage of those codes, and the corresponding maintenance procedures.

The codes were devised for usage of any application requiring the expression of calendar systems in coded form, including for data interchange.



## 1. 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 639-1, International Organization for Standardization. *Codes for the representation of names of languages — Part 1: Alpha-2 code*. First edition. Geneva. <https://www.iso.org/standard/22109.html>. [viewed: October 11, 2024].

ISO 639-2, International Organization for Standardization. *Codes for the representation of names of languages — Part 2: Alpha-3 code*. First edition. Geneva. <https://www.iso.org/standard/4767.html>. [viewed: October 11, 2024].

ISO 3166-1, International Organization for Standardization. *Codes for the representation of names of countries and their subdivisions — Part 1: Country code*. Fourth edition. Geneva. <https://www.iso.org/standard/72482.html>. [viewed: October 11, 2024].

ISO 5127, International Organization for Standardization. *Information and documentation — Foundation and vocabulary*. Second edition. Geneva. <https://www.iso.org/standard/59743.html>. [viewed: October 11, 2024].

ISO 15924, International Organization for Standardization. *Information and documentation — Codes for the representation of names of scripts*. Second edition. Geneva. <https://www.iso.org/standard/81905.html>. [viewed: October 11, 2024].

## Date and time — Codes for calendar systems

### 2. Terms and definitions

For the purposes of this document, the terms and definitions given in [ISO 34000](#) and the following apply.

#### 2.1. code

data representation in different forms according to a pre-established set of rules

[SOURCE: [ISO 639-2](#)]

#### 2.2. calendar code

code ([Clause 2.1](#)) used to represent a calendar system

#### 2.3. language code

combination of characters used to represent the name of a language or languages

[SOURCE: [ISO 5127, Clause 3.2.5.14](#)]

#### 2.4. script code

combination of characters used to represent the name of a script

[SOURCE: [ISO 15924, Clause 3.8](#)]

### 3. Calendar system models overview

The data models are arranged as shown in the following structure.

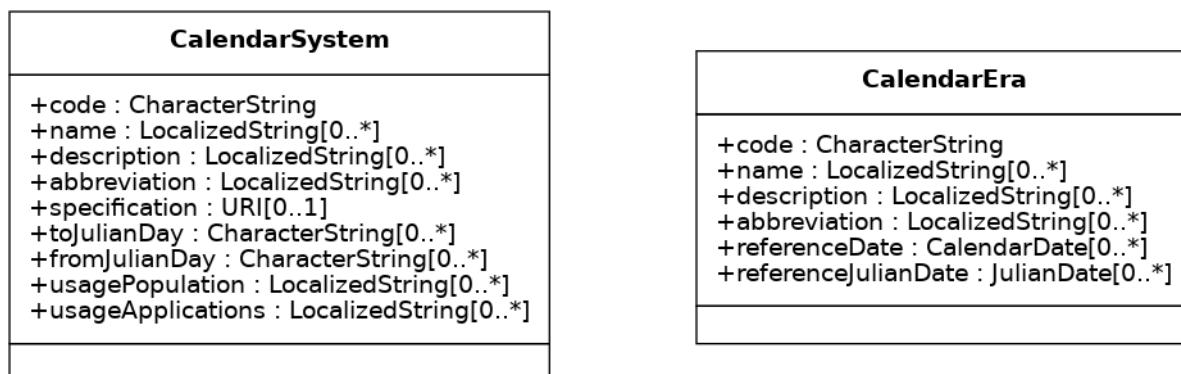


Figure 1

## 4. Data types

### 4.1. Core data types

These are the core data types used within this document.

- CharacterString
- DateTime, Date, Time
- Number, Integer, Decimal, Real
- Vector
- Boolean

### 4.2. Common data types

The following data models are used by other data models specified in this document.



Figure 2

### 4.3. iso15924Code

The [ISO 15924](#) code list is used in this document to represent scripts.



## 4.4. iso639Code

The [ISO 639-2](#) code list is used in this document to represent languages.

## 4.5. LocalizedTag

The LocalizedTag is a data structure used to tag a text with the script, language and transcription codes.

**Table 1 — LocalizedTag attributes**

| Name   | Definition                                     | Mandatory / Optional / Conditional | Max Occur | Data Type    |
|--------|--|------------------------------------|-----------|--------------|
| lang   | ISO 639-2 code for identification of language. | M                                  | 1         | iso639Code   |
| script | ISO 15924 code for identification of script.   | M                                  | 1         | iso15924Code |

## 4.6. LocalizedString

This represents a localized string with corresponding localization information.

**Table 2 — LocalizedString attributes**

| Name | Definition                | Mandatory / Optional / Conditional | Max Occur | Data Type    |
|------|---------------------------|------------------------------------|-----------|--------------|
| tag  | Localization information. | M                                  | 1         | LocalizedTag |

## 4.7. JulianDate

This represents a reference to a day in the Julian Date system.

**Table 3 — JulianDate attributes**

| Name   | Definition                          | Mandatory / Optional / Conditional | Max Occur | Data Type |
|--------|-------------------------------------|------------------------------------|-----------|-----------|
| number | Number of days since Julian Date 0. | M                                  | 1         | Integer   |

## 4.8. CalendarDate

This represents a date reference in a calendar system.

**Table 4 — CalendarDate attributes**

| Name            | Definition  | Mandatory / Optional / Conditional | Max Occur | Data Type       |
|-----------------|---|------------------------------------|-----------|-----------------|
| era             | Code of the calendar era  | O                                  | 1         | CharacterString |
| yearCycleNumber | Number of the year cycle (can be 0 or negative), used for calendar where year identification follows a cyclic pattern (ex: in a calendar where years follow a 60 years cycle, use this field to indicate the number of the current 60 years cycle). A CalendarDate cannot have both era and yearCycleNumber | O                                  | 1         | Integer         |
| year            | Ordinal number of year in the calendar era or year cycle  | O                                  | 1         | Integer         |

:2019

| Name          | Definition   | Mandatory / Optional / Conditional | Max Occur | Data Type |
|---------------|--|------------------------------------|-----------|-----------|
| month         | Nominal number of month in the calendar year (note that in some calendars, nominal and ordinal month numbers can differ)                 | O                                  | 1         | Integer   |
| monthLeapFlag | Flag indicating if the month is a leap month (second month in a row with the same nominal number)  | O                                  | 1         | Boolean   |
| day           | Nominal number of day in the previous date reference construct (note that in some calendars, nominal and ordinal day numbers can differ) | O                                  | 1         | Integer   |
| dayLeapFlag   | Flag indicating if the day is a leap day (second day in a row with the same nominal number)  | O                                  | 1         | Boolean   |

## 5. Data models

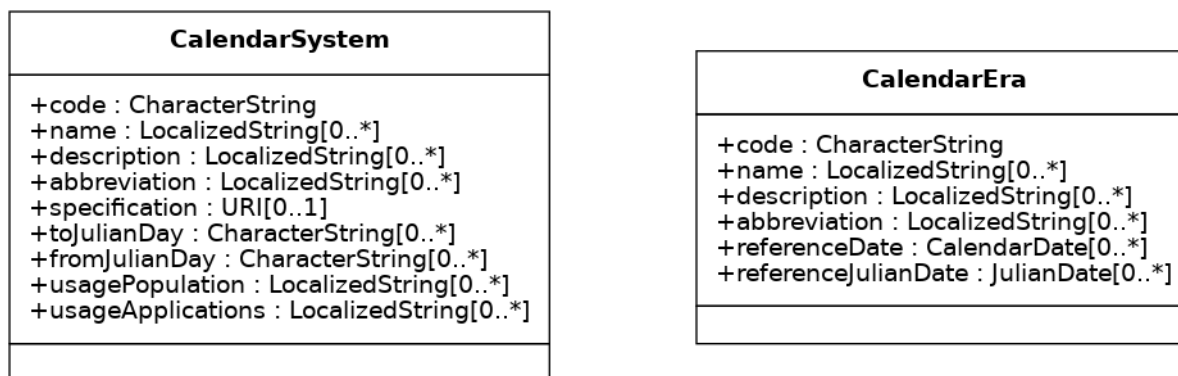


Figure 3

### 5.1. CalendarSystem

This represents a calendar system. Calendar systems are used to identify and mark days within a year.

Table 5 — CalendarSystem attributes

| Name         | Definition   | Mandatory / Optional / Conditional | Max Occur | Data Type       |
|--------------|--|------------------------------------|-----------|-----------------|
| code         | Unique identifying code of this calendar era.  | M                                  | 1         | CharacterString |
| name         | Name of this calendar era.   | O                                  | N         | LocalizedString |
| description  | Localized versions of the calendar system names tagged with script codes ( <a href="#">ISO 15924</a> ) and language codes ( <a href="#">ISO 639-1</a> ). | O                                  | N         | LocalizedString |
| abbreviation | Abbreviation of this calendar era. Multiple abbreviations are accepted.  | O                                  | N         | LocalizedString |

| Name              | Definition   | Mandatory / Optional / Conditional | Max Occur | Data Type       |
|-------------------|--|------------------------------------|-----------|-----------------|
| specification     | A URI that provides the full specification of this calendar system.  | O                                  | 1         | URI             |
| toJulianDay       | Mechanism to convert a calendar date in this calendar system to a calendar date in the Julian Date system. | O                                  | N         | CharacterString |
| fromJulianDay     | Mechanism to convert a calendar date in the Julian Date system to a calendar date in this calendar system. | O                                  | N         | CharacterString |
| usagePopulation   | Populations that this calendar system is relevant to.  | O                                  | N         | LocalizedString |
| usageApplications | Applications that this calendar system is relevant to.   | O                                  | N         | LocalizedString |

## 5.2. CalendarEra

This represents a calendar era.

NOTE calendar eras within a calendar system may overlap, and is therefore unnecessary to have an end reference date.

**Table 6 — CalendarEra attributes**

| Name                | Definition  | Mandatory / Optional / Conditional | Max Occur | Data Type       |
|---------------------|---|------------------------------------|-----------|-----------------|
| code                | Unique identifying code of this calendar era.   | M                                  | 1         | CharacterString |
| name                | Name of this calendar era.  | O                                  | N         | LocalizedString |
| description         | Localized versions of the calendar era names tagged with script codes ( <a href="#">ISO 15924</a> ) and language codes ( <a href="#">ISO 639-1</a> ). | O                                  | N         | LocalizedString |
| abbreviation        | Abbreviation of this calendar era. Multiple abbreviations are accepted.   | O                                  | N         | LocalizedString |
| referenceDate       | Date of current calendar era at the day referred to by referenceJulianDate.   | O                                  | N         | CalendarDate    |
| referenceJulianDate | Julian date that marks the beginning of this calendar era.  | O                                  | N         | JulianDate      |

## 6. Codes and identifiers

### 6.1. Requirements

#### 6.1.1. General

A calendar system is eligible for assignment of an entry based on its usage of date identification and the need for international interchange.

Usage of a calendar system is determined by at least one of the following conditions, by presentation of evidence:

:2019

- The system has been approved for official use at some level of government (current, historic, or will be in the near future);
- The system has been used to identify with dates, such as in bibliographic information (current, historic, or will be in the near future).

Justification should be given to indicate that international interchange is necessary.

A similar set of requirements apply to the registration of calendar eras. A calendar era entry must be associated with at least one calendar system entry.

## 6.2. Principles for allocation of code elements

### 6.2.1. Relationship with names

Calendar systems have codes in the following format:

[system-code]

**Figure 4**

#### EXAMPLE

gregorian or gre for the Gregorian calendar, whose specification is provided in [ISO 8601-1](#).

### 6.2.2. Construction of the alphabetic code

The following rules are to be adhered to for the assignment of the alphabetic code:

- The alphabetic code uses combinations, in lower case, of between 3 and 20 fixed letters of the 26-character Latin alphabet.
- Codes shall encourage descriptive and distinguishable alphabetic names.

An additional short alias for the alphabetic code composed of 3 fixed letters of the 26-character Latin alphabet is allowed.

### 6.2.3. User assigned code elements

If users need code elements to represent calendar systems not included in the calendar code registry, the code prefix of zz can be used.

The code length for the calendar system identifier must be 3 letters.

Such calendar system identifiers are in the following format:

zz[calendar-system-identifier]

**Figure 5**

NOTE Users are advised that the above series of codes are not universals, those code elements are not compatible between different entities.

## 6.3. List of calendar system and their code elements

The list of items composing the content of the country code is initially compiled in a separate dataset outside of this document. Additional and new entries will be listed by the ISO 34300/AG.

Data attributes provided in the list is defined in [Clause 6](#).

## **Appendix A (normative) Registration**

### **A.1. Registration authority (ISO 34300/RA)**

A registration authority (ISO 34300/RA) has been appointed to operate under guidelines provided in this Annex.

It has been entrusted with the following functions with regard to the list of calendar systems and calendar eras, together with code assignments and information associated with each entry:

- 1) to add and eliminate these entries, in accordance with the rules in this document;
- 2) to advise users and ISO member bodies regarding application of such information;
- 3) to update and disseminate such information;
- 4) to maintain a reference list of such information;
- 5) to publish changes made to such information and the history of changes allowing traceability;
- 6) to administer the reservation of the codes.

Changes to the content of the list of entries becomes effective immediately upon publication.

The criteria provided in [Appendix A.3.1](#) to [Appendix A.6](#) shall be observed by the ISO 34300/RA for changes to the list of calendar systems and calendar eras, their code assignments and associated information, and for reservations of code elements.

### **A.2. Advisory group (ISO 34300/AG)**

An advisory group (ISO 34300/AG) has been appointed to ensure the operations of the registration authority (ISO 34300/RA) are in accordance with guidelines provided in this Annex.

### **A.3. Operations on list of calendar systems and calendar eras and their codes**

#### **A.3.1. Registration of a new calendar system and calendar era**

Additions to the list of calendar systems and calendar eras shall be made on the basis of information from upon the request of a member of ISO 34300/AG.

A calendar system is eligible for registration if it meets the requirements stated in [Clause 6.1](#).

The proposer is responsible for providing justification to the ISO 34300/AG regarding the eligibility of such addition.

The ISO 34300/AG will decide upon the addition, on the basis of eligibility and usage justification.

Code elements will be allocated by the ISO 34300/AG at its discretion.

Since a calendar system requires at least one calendar era, the application and assignment of calendar system and calendar era codes can be performed at once.

#### **A.3.2. Modification of a calendar system or calendar era code**

Modifications of a code within the list of calendar systems and calendar eras shall be made upon the request of a member of ISO 34300/AG.

The ISO 34300/AG will decide upon the modification, on the basis of the information received.

The previously assigned code is reserved after modification for backwards-compatibility purposes.

#### **A.4. Removal from the list of calendar system and calendar era codes**

Removal of a code from the list of calendar systems and calendar eras shall be made upon the request of a member of ISO 34300/AG.

The ISO 34300/AG will decide upon the deletion, on the basis of the information received. The corresponding code element is reserved.

#### **A.5. Removal of elements from the list of calendar system and calendar era codes**

Deletion from the list of calendar system and calendar era codes shall be made only by the ISO 34300/AG or upon a request to it.

The ISO 34300/AG will decide upon the deletion, on the basis of the information received. The corresponding code element is reserved.

#### **A.6. Alterations to elements on list of calendar system and calendar era codes**

Alterations to a registered element shall be made only by the ISO 34300/AG or upon a request to it.

A significant change of name may require the ISO 34300/AG to change the alpha code element concerned. The ISO 34300/AG, however, shall endeavor to maintain stability in the list of code elements.

#### **A.7. Reservation of code elements**

##### **A.7.1. Introduction**

Some code elements are reserved:

- for a limited period when their reservation is the result of the deprecation ( [Appendix A.4](#)) or the alteration ([Appendix A.6](#)) of an entry;
- for an indeterminate period when the reservation is the result of the application of international law or of exceptional requests ( [Appendix A.7.3](#)).

##### **A.7.2. Period of non-allocation**

Code elements that the ISO 34300/AG has altered or deleted should not be reallocated during a period of at least ten years after the change.

The exact period is determined in each case on the basis of the extent to which the former code element was used.

##### **A.7.3. Exceptional reservations**

Code elements may be reserved, in exceptional cases, for calendar systems and calendar eras which the ISO 34300/AG has decided not to include in the lists maintained by ISO 34300/RA, but for which an interchange or encoding requirement exists.

##### **A.7.4. Reallocation**

Before reallocating a former code element or a formerly reserved code element, the ISO 34300/AG shall consult, as appropriate, the authority or agency on whose behalf the code element was reserved, and consideration shall be given to difficulties which might arise from the reallocation.

#### **A.7.5. List of reserved code elements**

A list of reserved code elements is kept by the ISO 34300/RA.

#### **A.8. Advice regarding use of code elements**

The ISO 34300/AG is available for consultation and assistance on the use of codes for calendar systems and calendar eras.

## Bibliography

- [1] ISO/IEC 10646-2, International Organization for Standardization and International Electrotechnical Commission. *Information technology — Universal Multiple-Octet Coded Character Set (UCS) — Part 2: Supplementary Planes*. First edition. Geneva. <https://www.iso.org/standard/33208.html>. [viewed: October 11, 2024].
- [2] ISO/IEC TR 15285, International Organization for Standardization and International Electrotechnical Commission. *Information technology — An operational model for characters and glyphs*. First edition. Geneva. <https://www.iso.org/standard/27163.html>. [viewed: October 11, 2024].
- [3] ISO 8601-1, International Organization for Standardization. *Date and time — Representations for information interchange — Part 1: Basic rules*. First edition. Geneva. <https://www.iso.org/standard/70907.html>. [viewed: October 11, 2024].
- [4] The XXIIIrd International Astronomical Union General Assembly, *The XXIIIrd International Astronomical Union General Assembly*, 1997. Available at: <https://www.iers.org/ IERS/EN/ Science/Recommendations/resolutionB1.html>
- [5] ISO 34000, International Organization for Standardization. *Date and time — Vocabulary*. First edition. Geneva. <https://www.iso.org/standard/77019.html>. [viewed: October 11, 2024].