CalConnect TC DATETIME

Date and time — Concepts and terminology

Working Draft Standard

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The Calendaring and Scheduling Consortium, Inc. 2019

The Calendaring and Scheduling Consortium, Inc.

4390 Chaffin Lane
McKinleyville
California 95519
United States of America

copyright@calconnect.org
www.calconnect.org

Contents

Foreword

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This document was prepared by Technical Committee *DATETIME*.

Introduction

ISO Recommendations and Standards relating to date and time concepts have been available since 1971.

This document presents terms and definitions for selected concepts relevant to date and time concepts and of their representation.

Specifically, the terminology presented in this document:

— serve as a sound basis in the understanding of date and time;
— guide new developments in the field by underpinning mutual understanding; and
— serve as a quick and handy reference for those newly inaugurated to this field.

Most terms in this document were sourced from ISO 8601-1:— and ISO 8601-2:—.

Date and time — Concepts and terminology

1. Scope

This document provides a concept system and a standard set of terminology related to date and time, from basic concepts to those of their representation.

The scope of the vocabulary provided in this document corresponds to that of ISO/TC 154/WG 5: Representation of dates and times.

2. Normative references

There are no normative references in this document.

3. Terms, definitions and abbreviated terms

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

3.1. Terms and definitions

3.1.1. Basic concepts

3.1.1.1.
date
time (Clause 3.1.1.2) on the *calendar* (Clause 3.1.1.20) *time scale* (Clause 3.1.1.5)

Note 1 to entry: Common forms of date include: *calendar date* (Clause 3.1.2.7), *ordinal date* (Clause 3.1.2.8), and *week date* (Clause 3.1.2.9).

3.1.1.2.
time
mark attributed to an *instant* (Clause 3.1.1.3) or a *time interval* (Clause 3.1.1.6) on a specified *time scale* (Clause 3.1.1.5)

Note 1 to entry: The term "`time`" is often used in common language. However, it should only be used if the meaning is clearly visible from the context.

Note 2 to entry: On a time scale consisting of successive time intervals, such as a *clock* (Clause 3.1.1.9) or *calendar* (Clause 3.1.1.20), distinct instants may be expressed by the same time.

Note 3 to entry: This definition corresponds closely with the definition of the term "`date`" in IEC Electropedia, Clause 113-01-12.

3.1.1.3.
instant
point on the *time axis* (Clause 3.1.1.4)

Note 1 to entry: An instantaneous event occurs at a specific instant.

[SOURCE: IEC Electropedia, Clause 113-01-08]

3.1.1.4.
time axis
mathematical representation of the succession in time according to the space-time model of instantaneous events along a unique axis

Note 1 to entry: According to the theory of special relativity, the time axis depends on the choice of a spatial reference frame.

Note 2 to entry: In IEC Electropedia, Clause 113-01-03, time according to the space-time model is defined to be the one-dimensional subspace of space-time, locally orthogonal to space.

[SOURCE: IEC Electropedia, Clause 113-01-07, modified — The words "according to the space-time" have been added; the phrase "special theory of relativity" has been changed to "theory of special relativity" for clarity; Note 2 to entry has been added.]

3.1.1.5.
time scale
system of ordered marks which can be attributed to *instants* (Clause 3.1.1.3) on the *time axis* (Clause 3.1.1.4), one instant being chosen as the origin

Note 1 to entry: A time scale may amongst others be chosen as:
- continuous, e.g. international atomic time (TAI) (see IEC Electropedia, Clause 713-05-18);
- continuous with discontinuities, e.g. *Coordinated Universal Time (UTC)* (Clause 3.1.1.12) due to *leap seconds* (Clause 3.1.1.26), *standard time* (Clause 3.1.1.15) due to summer time and winter time;
- successive steps, e.g. *calendars* (Clause 3.1.1.20), where the *time axis* (Clause 3.1.1.4) is split up into a succession of consecutive *time intervals* (Clause 3.1.1.6) and the same mark is attributed to all instants of each time interval;
- discrete, e.g. in digital techniques.

[SOURCE: IEC Electropedia, Clause 113-01-11, modified — The words "amongst others" in Note 1 to entry have been added; NOTEs 2 and 3 have been deleted.]

3.1.1.6.
time interval
part of the *time axis* (Clause 3.1.1.4) limited by two *instants* (Clause 3.1.1.3) and, unless otherwise stated, the limiting instants themselves

[SOURCE: IEC Electropedia, Clause 113-01-10, modified — the words "and, unless otherwise stated, the limiting instants themselves" have been added; the NOTEs have been deleted.]

3.1.1.7.
time scale unit
unit of measurement of a *duration* (Clause 3.1.1.8)

EXAMPLE 1 Calendar year, calendar month, calendar day are time scale units of the Gregorian calendar.

EXAMPLE 2 Clock hour, clock minutes, clock seconds are time scale units of the 24-hour clock.

3.1.1.8.
duration
non-negative quantity of time equal to the difference between the final and initial *instants* (Clause 3.1.1.3) of a *time interval* (Clause 3.1.1.6)

Note 1 to entry: The duration is one of the base quantities in the International System of Quantities (ISQ) on which the International System of Units (SI) is based. The term "time" instead of "duration" is often used in this context and also for an infinitesimal duration.

Note 2 to entry: For the term "duration", expressions such as "time" or "time interval" are often used, but the term "time" is not recommended in this sense and the term "time interval" is deprecated in this sense to avoid confusion with the concept of "time interval".

Note 3 to entry: The exact duration of a *time scale unit* (Clause 3.1.1.7) depends on the *time scale* (Clause 3.1.1.5) used. For example, the durations of a year, month, week, day, hour, or minute, may

depend on when they occur [in a *Gregorian calendar* (Clause 3.1.1.21), a *calendar month* (Clause 3.1.2.19) can have a duration of 28, 29, 30, or 31 days; in a *24-hour clock* (Clause 3.1.1.10) a *clock minute* (Clause 3.1.2.4) can have a duration of 59, 60, or 61 seconds, etc.]. Therefore, the exact duration can only be evaluated if the exact duration of each is known.

Note 4 to entry: This definition is closely related to NOTE 1 of "`duration`" in IEC Electropedia, Clause 113-01-13.

3.1.1.9.
clock
time scale (Clause 3.1.1.5) suited for intra-day time measurements

Note 1 to entry: *clock second* (Clause 3.1.2.2), *clock minute* (Clause 3.1.2.4) and *clock hour* (Clause 3.1.2.6) are often *time scale units* (Clause 3.1.1.7) included in a clock.

EXAMPLE The *24-hour clock* (Clause 3.1.1.10) is a type of clock.

3.1.1.10.
24-hour clock
clock (Clause 3.1.1.9) that subdivides a *calendar day* (Clause 3.1.2.11) into 24 *clock hours* (Clause 3.1.2.6)

EXAMPLE UTC (Clause 3.1.1.12) a type of 24-hour clock that is often used as the basis time scale of standard times.

3.1.1.11.
recurring time interval
series of consecutive *time intervals* (Clause 3.1.1.6) of identical *duration* (Clause 3.1.1.8)

Note 1 to entry: If the duration of the time intervals is measured in *calendar* (Clause 3.1.1.20) entities, the duration of each time interval depends on the calendar *dates* (Clause 3.1.1.1) of its start and its end.

Note 2 to entry: If the starting instants of time intervals are repeated according to a set of rules, the "`repeat rules for recurring time intervals`" in ISO 8601-2:—, Clause 5 apply.

3.1.1.12.
UTC
Coordinated Universal Time
time scale (Clause 3.1.1.5) with the same rate as International Atomic Time (TAI), but differing from TAI only by an integral number of *seconds* (Clause 3.1.2.1)

Note 1 to entry: UTC is a *basis time scale* (Clause 3.1.1.14) commonly used across the world from which local time scales are derived.

Note 2 to entry: UTC is produced by the Bureau International des Poids et Mesures (BIPM), i.e. the International Bureau of Weights and Measures.

Note 3 to entry: TAI is a continuous time scale produced by the BIPM based on the best realizations of the SI second. TAI is a realization of Terrestrial Time (TT) with the same rate as that of TT, as defined by IAU Resolution B1.9 (2010): Re-definition of Terrestrial Time TT.

[SOURCE: BIPM Recommendation CCTF 3 (2017): Recommendation on the definition of timescales, modified — The definition of TAI has been included as Note 3 to entry.]

3.1.1.13.
UTC of day
time of day (Clause 3.1.1.17) in *UTC* (Clause 3.1.1.12)

3.1.1.14.
basis time scale
time scale (Clause 3.1.1.5) established to serve as reference time by a competent authority

Note 1 to entry: The basis time scale is not always legally UTC in all countries.

EXAMPLE *UTC* (Clause 3.1.1.12), TAI, GPS system time, Galileo system time, BeiDou system time, LORAN station system time are basis time scales in current use.

3.1.1.15.
standard time
time scale (Clause 3.1.1.5) derived from a *basis time scale* (Clause 3.1.1.14) with a *time shift* (Clause 3.1.1.27) established by a competent authority

Note 1 to entry: The time shift of a standard time may vary in the course of a year, such as due to daylight savings.

Note 2 to entry: Many standard times use UTC as their basis and are often associated with a geographical location. A timezone may be associated with one or more standard times.

Note 3 to entry: This definition corresponds closely to, but is more general than, the definition of the term "`standard time`" in IEC Electropedia, Clause 113-01-17.

EXAMPLE 1 Some standard times do not vary within a year, such as US Eastern Standard Time (EST), US Eastern Daylight Time (EDT), Australia Western Standard Time (AWST), China Standard Time (CST), Hong Kong Standard Time (HKT), Korea Standard Time (KST) and Japanese Standard Time (JST).

EXAMPLE 2 Some standard times vary within a year, such as US Eastern Time (ET) and Australian Central Standard Time (ACST).

3.1.1.16.
local time scale
locally-applicable *standard time* (Clause 3.1.1.15)

3.1.1.17.
time of day
time (Clause 3.1.1.2) occurring within a *calendar day* (Clause 3.1.2.11)

Note 1 to entry: Generally, time of day relates to the *duration* (Clause 3.1.1.8) elapsed after the beginning of the day. However, this correlation breaks when changes occur in the *time scale* (Clause 3.1.1.5) that applies to the time of day, such as *time shifts* (Clause 3.1.1.27) and *leap seconds* (Clause 3.1.1.26).

Note 2 to entry: This definition corresponds closely with the definition of "`clock time`" given in IEC Electropedia, Clause 113-01-18, except that the concepts of *duration* (Clause 3.1.1.8) and *time scale* (Clause 3.1.1.5) are not used in this definition.

3.1.1.18.
basis time of day
time of day (Clause 3.1.1.17) in a *basis time scale* (Clause 3.1.1.14)

EXAMPLE *UTC of day* (Clause 3.1.1.13) is a type of basis time of day.

3.1.1.19.
local time of day
time of day (Clause 3.1.1.17) in a *local time scale* (Clause 3.1.1.16)

3.1.1.20.
calendar
time scale (Clause 3.1.1.5) that uses the *time scale unit* (Clause 3.1.1.7) of *calendar day* (Clause 3.1.2.11) as its basic unit

Note 1 to entry: *calendar month* (Clause 3.1.2.19) and *calendar year* (Clause 3.1.2.21) are time scale units often included in a calendar.

EXAMPLE The *Gregorian calendar* (Clause 3.1.1.21) is a type of calendar.

3.1.1.21.
Gregorian calendar
calendar (Clause 3.1.1.20) in general use that defines a calendar year (Clause 3.1.2.21) that closely approximates the tropical year

3.1.1.22.
common year
calendar year (Clause 3.1.2.21) in the *Gregorian calendar* (Clause 3.1.1.21) that has 365 *calendar days* (Clause 3.1.2.11)

3.1.1.23.
leap year
calendar year (Clause 3.1.2.21) in the *Gregorian calendar* (Clause 3.1.1.21) that has 366 *calendar days* (Clause 3.1.2.11)

Note 1 to entry: A leap year is a calendar year whose year number is divisible by four and is not a *centennial year* (Clause 3.1.1.24), or a centennial year whose year number is divisible by four hundred.

3.1.1.24.
centennial year
calendar year (Clause 3.1.2.21) in the *Gregorian calendar* (Clause 3.1.1.21) whose year number is divisible without remainder by one hundred

3.1.1.25.
week calendar
calendar (Clause 3.1.1.20) based on an unbounded series of contiguous *calendar weeks* (Clause 3.1.2.16) that uses the *time scale unit* (Clause 3.1.1.7) of calendar week as its basic unit to represent a *calendar year* (Clause 3.1.2.21), according to the rule that the first calendar week of a calendar year is the week including the first Thursday of that year, and that the last one is the week immediately preceding the first calendar week of the next calendar year

Note 1 to entry: This rule is based on the principle that a week belongs to the calendar year in which the majority of its *calendar days* (Clause 3.1.2.11) belongs.

Note 2 to entry: In the week calendar, calendar days of the first and last calendar week of a calendar year may belong to the previous and the next calendar year respectively in the *Gregorian calendar* (Clause 3.1.1.21).

3.1.1.26.
leap second
intentional time step of one *second* (Clause 3.1.2.1) to adjust *UTC* (Clause 3.1.1.12) to ensure appropriate agreement with UT1, a *time scale* (Clause 3.1.1.5) based on the rotation of the Earth

Note 1 to entry: See also ITU-R TF.460-6.

Note 2 to entry: An inserted second is called a positive leap second and an omitted second is called a negative leap second. A positive leap second is inserted after [23:59:59Z] and can be represented as [23:59:60Z]. A negative leap second is achieved by the omission of [23:59:59Z]. Insertion or omission

takes place as determined by the International Earth Rotation and Reference Systems Service (IERS), normally on 30 June or 31 December, but if necessary on 31 March or 30 September.

3.1.1.27.
time shift
constant *duration* (Clause 3.1.1.8) difference between *times* (Clause 3.1.1.2) of two *time scales* (Clause 3.1.1.5)

3.1.1.28.
approximate date
calendar date which is an estimate whose value is asserted to be possibly correct

Note 1 to entry: The degree of confidence in approximation depends on the application.

3.1.1.29.
uncertain date
calendar date whose source is considered *dubious* (Clause 3.1.1.31)

3.1.1.30.
date with unspecified part
calendar date of which a part is unstated

Note 1 to entry: The unstated part can be year, year and month, month, month and day, or year and day. It is unstated because it has not (yet) been assigned (it might be assigned in the future), or because it is classified, or unknown, or for any other reason.

3.1.1.31.
dubious
not to be relied upon

3.1.1.32.
qualification symbol
symbol that indicates certain qualification to a value it applies to

EXAMPLE The symbol [?] indicates that the value it applies to is uncertain

3.1.1.33.
movable day
repeatedly occurring day in a calendar that is represented by criteria set by one or more *selection rules* (Clause 3.1.1.40), but does not always resolve to a fixed calendar day in every repeating cycle

Note 1 to entry: The selection of this term pays homage to the phrase “movable feast” used in some calendars to indicate the rule-based determination of annual events.

EXAMPLE 1 Thanksgiving Day in the U.S. and Canada are considered movable days, set to the fourth Thursday in November and the second Monday in October, respectively.

EXAMPLE 2 First Day of Summer (*sumardagurinn fyrsti*) in Iceland is considered a movable day, set to the first Thursday after April 18th.

EXAMPLE 3 Father’s Day is celebrated on the third Sunday in June in North America, and is considered a movable day.

3.1.1.34.
negative duration
duration in the reverse direction to the proceeding time scale

3.1.1.35.
feature
single function or group of functions

3.1.1.36.
conformity level
value assigned to a subset of *features* (Clause 3.1.1.35) within a *profile* (Clause 3.1.1.37)

Note 1 to entry: A profile may refer to these conformity levels to facilitate the specification of conformance to the profile.

3.1.1.37.
profile
subset of *features* (Clause 3.1.1.35) described in a standard or a set of standards

Note 1 to entry: A community may develop a profile to describe how to carry out functions or apply features specified in a standard or family of standards in a manner relevant to that community.

Note 2 to entry: A profile often describes what features are to be supported and how to apply those features. In cases where multiple methods are allowed for a required feature, a profile may select a single method. In cases where a particular function allows different interpretations, a profile may select a single interpretation or provide clarification. A profile may list out features that need not be supported. It may specify several *conformity levels* (Clause 3.1.1.36).

3.1.1.38.
ISO 8601 profile
profile (Clause 3.1.1.37) whose base standard is the ISO 8601 series

3.1.1.39.
repeat rule
set of *eligible time intervals* (Clause 3.1.1.42) and *selection rules* (Clause 3.1.1.40) that allows computation of a set of *matching instants* (Clause 3.1.1.43)

3.1.1.40.
selection rule
rule specifying restrictions on the value of a time scale component

3.1.1.41.
repeat cycle
set of repeating instants, calculated by a specified start instant and specified duration gap between the repeating instants

3.1.1.42.
eligible time interval
time interval eligible for matching using *selection rules* (Clause 3.1.1.40)

3.1.1.43.
matching instants
set of instants, computed by a *repeat rule* (Clause 3.1.1.39), that belongs within *eligible time intervals* (Clause 3.1.1.42) and fulfills criteria set by specified *selection rules* (Clause 3.1.1.40)

3.1.1.44.
date time formula
expression that specifies modification of a date and time expression with a duration

3.1.1.45.
durational unit
time scale component that composes the duration date and time representation

3.1.1.46.
grouped time scale unit
time scale unit composed of a duration expressed by one or more *durational units* (Clause 3.1.1.45)

3.1.1.47.
sub-year grouping
grouping composed of time scale components of a lower order than the calendar year time scale

3.1.1.48.
normal sub-year grouping
sub-year grouping (Clause 3.1.1.47) where the duration of its elements sum up to the duration of one calendar year

Note 1 to entry: A normal sub-year grouping can be composed of time scale units with different durations.

EXAMPLE 1 The bimonthly time scale unit can be repeated into a normal sub-year grouping, where 12 months can be divided cleanly by units of 2 months each.

EXAMPLE 2 The four seasons in the commonly used *four season calendar* (Clause 3.1.1.51) make a normal sub-year grouping as the duration of their combination is exactly one calendar year.

EXAMPLE 3 Six season calendars used in various cultures are examples of normal sub-year groupings.

3.1.1.49.
equation of time
difference between mean solar time and apparent solar time, which varies with time within a calendar year

Note 1 to entry: A clock is a type of device that measures mean solar time; a sundial is a type of device that measures apparent solar time.

3.1.1.50.
season
element of a *normal sub-year grouping* (Clause 3.1.1.48), amongst which the transition between each element can be based on calendrical, meteorological, astronomical, solar or ecological events

3.1.1.51.
four-season calendar
calendar in general use resulting from the division of a calendar year into four *seasons* (Clause 3.1.1.50)

Note 1 to entry: A single calendar date may represent different seasons depending on local customs or location, such as the difference between the northern or southern hemispheres.

Note 2 to entry: The four seasons are namely *spring* (Clause 3.1.1.52), *summer* (Clause 3.1.1.53), *autumn* (Clause 3.1.1.54), and *winter* (Clause 3.1.1.55)

3.1.1.52.
spring
season (Clause 3.1.1.50) in the *four-season calendar* (Clause 3.1.1.51) following *winter* (Clause 3.1.1.55) and preceding *summer* (Clause 3.1.1.53)

3.1.1.53.
summer
season (Clause 3.1.1.50) in the *four-season calendar* (Clause 3.1.1.51) following *spring* (Clause 3.1.1.52) and preceding *autumn* (Clause 3.1.1.54)

3.1.1.54.
autumn
season (Clause 3.1.1.50) in the *four-season calendar* (Clause 3.1.1.51) following *summer* (Clause 3.1.1.53) and preceding *winter* (Clause 3.1.1.55)

3.1.1.55.
winter
season (Clause 3.1.1.50) in the *four-season calendar* (Clause 3.1.1.51) following *autumn* (Clause 3.1.1.54) and preceding *spring* (Clause 3.1.1.52)

3.1.2. Time and date units

3.1.2.1.
second
base unit of *duration* (Clause 3.1.1.8) measurement in the International System of Units (SI)

Note 1 to entry: As defined by the CGPM (Conférence générale des poids et mesures, General Conference on Weights and Measures) on the proposal of the CIPM (Comité International des Poids et Mesures, International Committee of Weights and Measures).

Note 2 to entry: See also ISO 80000-3:2019.

3.1.2.2.
clock second
time scale unit (Clause 3.1.1.7) whose *duration* (Clause 3.1.1.8) is one *second* (Clause 3.1.2.1)

Note 1 to entry: Clock second is in common parlance often referred to as second, however in this document clock second and second have different definitions.

3.1.2.3.
minute
duration (Clause 3.1.1.8) of 60 *seconds* (Clause 3.1.2.1)

Note 1 to entry: See also ISO 80000-3:2019.

Note 2 to entry: The duration of a minute is 60 seconds except if modified by the insertion or deletion of a leap second

3.1.2.4.
clock minute
time scale unit (Clause 3.1.1.7) whose duration is one *minute* (Clause 3.1.2.3)

Note 1 to entry: Clock minute is in common parlance often referred to as minute, however in this document clock minute and minute have different definitions.

3.1.2.5.
hour
duration (Clause 3.1.1.8) of 60 *minutes* (Clause 3.1.2.3)

Note 1 to entry: See also ISO 80000-3:2019.

3.1.2.6.
clock hour
time scale unit (Clause 3.1.1.7) whose *duration* (Clause 3.1.1.8) is one *hour* (Clause 3.1.2.5)

Note 1 to entry: Clock hour is in common parlance often referred to as hour, however in this document clock hour and hour have different definitions.

3.1.2.7.
calendar date
particular *calendar day* (Clause 3.1.2.11) represented by its *calendar year* (Clause 3.1.2.21), its *calendar month* (Clause 3.1.2.19) and its *calendar day of month* (Clause 3.1.2.13)

3.1.2.8.
ordinal date
particular *calendar day* (Clause 3.1.2.11) represented by its *calendar year* (Clause 3.1.2.21) and its *calendar day of year* (Clause 3.1.2.14)

3.1.2.9.
week date
particular *calendar day* (Clause 3.1.2.11) represented by its *calendar year* (Clause 3.1.2.21) to which its *calendar week* (Clause 3.1.2.16) belongs, its *calendar week of year* (Clause 3.1.2.17), and its *calendar day of week* (Clause 3.1.2.12)

3.1.2.10.
day
duration (Clause 3.1.1.8) of a *calendar day* (Clause 3.1.2.11)

Note 1 to entry: The term “day” applies also to the duration of any *time interval* (Clause 3.1.1.6) which starts at a certain *time of day* (Clause 3.1.1.17) on a certain calendar day and ends at the same time of day on the next calendar day.

Note 2 to entry: See also ISO 80000-3:2019.

3.1.2.11.
calendar day
time scale unit (Clause 3.1.1.7) starting at the beginning of the day and ending with the beginning of the next day [the latter being the starting *instant* (Clause 3.1.1.3) of the next calendar day]

Note 1 to entry: Calendar day is in common parlance often referred to as day, however in this document calendar day and day have different definitions.

Note 2 to entry: The *duration* (Clause 3.1.1.8) of a calendar day using the *24-hour clock* (Clause 3.1.1.10) is 24 *hours* (Clause 3.1.2.5); except if modified by:

- the insertion or deletion of *leap seconds* (Clause 3.1.1.26), by decision of the IERS; or
- the insertion or deletion of other time intervals, as may be prescribed by local authorities to alter the *time scale* (Clause 3.1.1.5) of local time.

3.1.2.12.
calendar day of week
day amongst the sequence of *week calendar* (Clause 3.1.1.25) days, namely, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday or Sunday

3.1.2.13.
calendar day of month
ordinal number of a *calendar day* (Clause 3.1.2.11) within a *calendar month* (Clause 3.1.2.19)

3.1.2.14.
calendar day of year
ordinal number of a *calendar day* (Clause 3.1.2.11) within a *calendar year* (Clause 3.1.2.21)

3.1.2.15.
week
duration (Clause 3.1.1.8) of a *calendar week* (Clause 3.1.2.16)

Note 1 to entry: The term "week" applies also to the duration of any *time interval* (Clause 3.1.1.6) which starts at a certain *time of day* (Clause 3.1.1.17) at a certain *calendar day of week* (Clause 3.1.2.12) and ends at the same time of day at the same calendar day of week in the next calendar week.

3.1.2.16.
calendar week
time scale unit (Clause 3.1.1.7) of seven *calendar days* (Clause 3.1.2.11) within a single *calendar year* (Clause 3.1.2.21) which begins on Monday and ends on Sunday, according to the *week calendar* (Clause 3.1.1.25)

3.1.2.17.
calendar week of year
ordinal number of a *calendar week* (Clause 3.1.2.16) within a *calendar year* (Clause 3.1.2.21) of the *week calendar* (Clause 3.1.1.25)

3.1.2.18.
month
duration (Clause 3.1.1.8) of a *calendar month* (Clause 3.1.2.19)

Note 1 to entry: The term "month" applies also to the duration of any *time interval* (Clause 3.1.1.6) which starts at a certain *time of day* (Clause 3.1.1.17) at a certain *calendar day* (Clause 3.1.2.11) of the calendar month and ends at the same time of day at the same calendar day of the next calendar month, if it exists.

Note 2 to entry: In certain applications a month is considered as a duration of 30 calendar days, but such usage is not supported by this document.

3.1.2.19.
calendar month
time scale unit (Clause 3.1.1.7) resulting from a defined division of a *calendar year* (Clause 3.1.2.21), each containing a specific number of *calendar days* (Clause 3.1.2.11)

Note 1 to entry: A calendar month is in common parlance often referred to as month, however in this document calendar month and month have different definitions.

3.1.2.20.
year
duration (Clause 3.1.1.8) of a *calendar year* (Clause 3.1.2.21)

Note 1 to entry: In the *Gregorian calendar* (Clause 3.1.1.21), a year has 365 or 366 *days* (Clause 3.1.2.10). The duration is 366 days if the corresponding *time interval* (Clause 3.1.1.6) begins February 28 or earlier in a *leap year* (Clause 3.1.1.23) or March 2 or later in a year immediately preceding a leap year. If the interval begins February 29 (on a leap year), or March 1 of a year preceding a leap year, the end date has to be agreed on. Otherwise the duration is 365 days.

Note 2 to entry: The term "year" applies also to the duration of any *time interval* (Clause 3.1.1.6) which starts at a certain *time of day* (Clause 3.1.1.17) at a certain *calendar date* (Clause 3.1.2.7) of the calendar year and ends at the same time of day at the same calendar date of the next calendar year with the exception noted in Note 1 to entry.

3.1.2.21.
calendar year
time scale unit (Clause 3.1.1.7) defined by the *calendar* (Clause 3.1.1.20) system

3.1.2.22.
decade
time scale unit (Clause 3.1.1.7) of 10 *calendar years* (Clause 3.1.2.21), beginning with a year whose year number is divisible without remainder by ten

Note 1 to entry: Decade is also used to refer to an arbitrary *duration* (Clause 3.1.1.8) of 10 years, however decade is not used as such in this document.

3.1.2.23.
century
time scale unit (Clause 3.1.1.7) of 100 *calendar years* (Clause 3.1.2.21) *duration* (Clause 3.1.1.8), beginning with a year whose year number is divisible without remainder by 100

Note 1 to entry: Century is also used to refer to an arbitrary duration of 100 years, however century is not used as such in this document.

EXAMPLE The "`19th century`" covers the years 1800 through 1899 as in common parlance.

3.1.3. Representations and formats

3.1.3.1.
date and time expression
expression indicating a *time* (Clause 3.1.1.2), *time interval* (Clause 3.1.1.6) or *recurring time interval* Clause 3.1.1.11

EXAMPLE '2018-08-01' is a date and time expression that indicates the first day of August of 2018 in the *Gregorian calendar* (Clause 3.1.1.21).

3.1.3.2.
date and time representation
representation of the format of one or more *date and time expressions* (Clause 3.1.3.1)

EXAMPLE [date] is a date and time representation that can be expanded as [year][month][day], which itself can be expanded into [YYYY][MM][DD]; '20180801' is a date and time expression that conforms to this representation.

3.1.3.3.
time scale component
representation of a *time scale unit* (Clause 3.1.1.7) within a *date and time expression* (Clause 3.1.3.1) or a *representation* (Clause 3.1.3.2)

Note 1 to entry: A time scale component is considered of a higher order of another, if the time scale unit it represents has a strictly larger *time interval* (Clause 3.1.1.6) than that of that another; the latter time scale component is therefore considered to be of a lower order.

Note 2 to entry: Common usage of this term often omits the leading phrase "`time scale`", such as representing a "`time scale component calendar year`" by just "`calendar year component`". This usage is deemed accepted in this document.

EXAMPLE 1 *calendar year* (Clause 3.1.2.21), *calendar month* (Clause 3.1.2.19), *calendar day* (Clause 3.1.2.11), *clock hour* (Clause 3.1.2.6), *clock minute* (Clause 3.1.2.4), *clock second* (Clause 3.1.2.2) are time scale components of a *complete representation* (Clause 3.1.3.6).

EXAMPLE 2 The calendar year time scale component is considered of a higher order than the calendar month time scale component, which is in turn of a higher order than the calendar day time scale component.

3.1.3.4.
basic format
date and time representation (Clause 3.1.3.2) that does not include separators between its *time scale components* (Clause 3.1.3.3)

3.1.3.5.
extended format
extension of the *basic format* (Clause 3.1.3.4) that includes separators between its *time scale components* (Clause 3.1.3.3)

3.1.3.6.
complete representation
date and time representation (Clause 3.1.3.2) that includes all the *time scale components* (Clause 3.1.3.3) associated with the *expression* (Clause 3.1.3.1)

3.1.3.7.
representation with reduced precision
abbreviation of a *date and time representation* (Clause 3.1.3.2) by omission of lower order *time scale components* (Clause 3.1.3.3)

3.1.3.8.
representation with decimal fraction
expansion of a *date and time representation* (Clause 3.1.3.2) by addition of a decimal fraction to the lowest order *time scale component* (Clause 3.1.3.3)

3.1.3.9.
decimal sign
character used in a *representation with decimal fraction* (Clause 3.1.3.8) to separate the integer part from the decimal fraction of a number

Note 1 to entry: The representations of the decimal signs (period or comma) and their usage rules are specified in ISO 80000-1:2009.

3.1.3.10.
expanded representation
expansion of a *date and time representation* (Clause 3.1.3.2) to allow identification of *calendar dates* (Clause 3.1.2.7) where the ordinal number identifying the *calendar year* (Clause 3.1.2.21) exceeds four digits

3.2. Abbreviated terms

For the purposes of this document, the following abbreviations apply.

BIPM Bureau International des Poids et Mesures / The International Bureau of Weights and Measures

CIPM Comité International des Poids et Mesures / The International Committee of Weights and Measures

ISQ International System of Quantities

SI International System of Units

TAI International Atomic Time

UTC Coordinated Universal Time

4. Concepts

4.1. General

This clause describes commonly used concepts for the usage of time scale systems.

4.2. Commonly used time scale units

4.2.1. Day

A day is a time scale unit that approximates the duration taken by the Earth for completing one rotation with respect to the Sun.

4.2.2. Month

A month is a time scale unit, that traditionally approximated the duration taken between two successive syzygies of the Moon.

4.2.3. Year

A year is a time scale unit that approximates the orbital period of the Earth around the Sun.

4.3. Second

A second is a time scale unit defined by the CIPM in the SI system based on radiation periods of the caesium-133 atom.

Traditionally, it represented a subdivision of the day being $\frac{1}{86,400}$ of a day.

4.4. Minute

A minute is a time scale unit often defined as $\frac{1}{60}$ of an hour or 60 seconds.

4.5. Hour

An hour is a time scale unit often defined as $\frac{1}{24}$ of a day or 3600 seconds.

4.6. Date and time organizing systems

4.6.1. General

Date and time organizing systems are often used for social, administrative and religious purposes, in order to allow an easier identification method of dates and times through the usage of hierarchical time scale units.

4.6.2. Calendar

A calendar is a system to organize days, based on time intervals marked by events related to the astronomical motion of planetary bodies, synchronized to the tropical year and orbital motion of the Earth.

A calendar system often includes the time scale components year, month and day.

4.6.3. Clock

The clock is a time scale used to identify and measure smaller time intervals within a day.

A clock system often includes the time scale components hour, minute and second.

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[11] IEC Electropedia, *IEC Electropedia*

[1] Under preparation. (Stage at the time of publication ISO/FDIS 8601-1)

[2] Under preparation. (Stage at the time of publication ISO/FDIS 8601-2)

