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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 154, *Processes, data elements and documents in commerce, industry and administration*.

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

ISO documents 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:

— serves as a sound basis in the understanding of date and time;

— guides new developments in the field by underpinning mutual understanding;

— serves as a quick and handy reference for those newly inaugurated to this field.

In this document, the decimal sign is a comma on the line, and each group of three digits are separated by a small space from the preceding digits, counting from the decimal sign, in accordance with the ISO/IEC Directives, Part 2.

However, Resolution 10 of the 22nd General Conference on Weights and Measures (Conférence Générale des Poids et Mesures, CGPM) in 2003 stated that:

“The decimal marker shall be either a point on the line or a comma on the line.”

And reaffirmed the following resolution from Resolution 7 of the 9th CGPM, 1948:

“Numbers may be divided in groups of three in order to facilitate reading.”

In practice, the choice between these alternatives depends on customary use in the language concerned. In the technical areas of date and time, it is customary for the decimal point always to be used, and that numbers are not grouped, for all languages.

Date and time — Vocabulary

1 Scope

This document defines terms related to date and time, from fundamental concepts to those of their usage and representation.

2 Normative references

There are no normative references in this document.

3 Terms related to general concepts

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
date
time (3.2) on the *calendar system* (6.1) *time scale* (3.5)

Note 1 to entry: Common forms of date include *calendar date* (7.8), *ordinal date* (7.9) and *week date* (7.10).

3.2
time
mark attributed to an *instant* (3.4) or a *time interval* (3.6) on a specified *time scale* (3.5)

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 system* (5.1) or *calendar system* (6.1), distinct instants may be expressed by the same time.

Note 3 to entry: This definition corresponds with the definition of the term "date" in IEC 60050-113:2011, 113-01-12.

3.2.1
proper time
time (3.2) on a *proper time scale* (4.1)

Note 1 to entry: See ITU-R TF.2018-0 and the BIPM SI Brochure[9] for additional information.

3.2.2
coordinate time
time on a *coordinate time scale* (4.2)

Note 1 to entry: Coordinate time is a mathematical coordinate in the four-dimensional space-time of the coordinate system. For a given event, the coordinate time has the same value everywhere.

Note 2 to entry: Coordinate times are not measured; rather, they are computed from the *proper times* (3.2.1) of clocks.

Note 3 to entry: The relation between coordinate time and proper time depends on the clock's position and state of motion in its gravitational environment and is derived by integration of the space-time interval.

Note 4 to entry: See ITU-R TF.2018-0 and BIPM SI Brochure[9] for additional information.

3.3
time axis
mathematical representation of the succession in time according to the space-time reference 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 60050-113:2011, 113-01-03, time according to the space-time reference is defined to be the one-dimensional subspace of space-time, locally orthogonal to space.

[SOURCE: IEC 60050-113:2011, 113-01-07, modified — In the definition, “time” is clarified as “time according to the space-time reference”; in note 1 to entry, the phrase “special theory of relativity” has been changed to “theory of special relativity” for clarity; note 2 to entry has been added.]

3.4
instant
point on the *time axis* (3.3)

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

[SOURCE: IEC 60050-113:2011, 113-01-08]

3.5
time scale
timescale
system of ordered marks which can be attributed to *instants* (3.4) on the *time axis* (3.3), one instant being chosen as the origin

EXAMPLE 1 *TAI* (4.9) is a continuous time scale.

EXAMPLE 2 *UTC* (4.7) is a time scale that is continuous but contains discontinuities. Discontinuities in UTC arise from the mechanism of inserting *leap seconds* (4.8).

EXAMPLE 3 *Local time* (4.6) with periodic changing of offsets from UTC during the year, such as seasonal time changes like summer time and winter time, results in a time scale that is continuous with discontinuities.

EXAMPLE 4 A *calendar system* (6.1) is a time scale composed of successive steps, with the time axis split up into a succession of consecutive *time intervals* (3.6), where the same mark is attributed to all instants of each time interval. For instance, all instants within a *calendar day* (7.13) are referred to by a reference to that calendar day only.

EXAMPLE 5 In signal processing, the process of sampling results in a discrete time scale.

Note 1 to entry: The system of ordered marks may be of the following nature: continuous, continuous with discontinuities, in successive steps, or discrete.

Note 2 to entry: The definition, notes to entry and EXAMPLEs are derived from IEC 60050-113:2011, 113-01-11, “timescale”.

3.6
time interval
part of the *time axis* (3.3) limited by two *instants* (3.4)

Note 1 to entry: Unless otherwise stated, a time interval is by default a *closed time interval* (3.6.1), which includes the limiting instants themselves.

[SOURCE: IEC 60050-113:2011, 113-01-10, modified – The original NOTEs have been deleted; note 1 to entry has been added.]

3.6.1
closed time interval
[*a*,*b*]
time interval (3.6) that includes both the beginning *instant* (3.4) and the final instant

3.6.2
open time interval
(*a*,*b*)
time interval (3.6) that does not include either the beginning *instant* (3.4) or the final instant

3.6.3
right half-open time interval
contiguous time interval
[*a*,*b*)
time interval (3.6) that includes the beginning *instant* (3.4) but not the final instant

3.6.4
left half-open time interval
(*a*,*b*]
time interval (3.6) that includes the final *instant* (3.4) but not the beginning instant

3.6.5
recurring time interval
series of consecutive *time intervals* (3.6) of identical *duration* (3.7)

Note 1 to entry: If the duration of the time intervals is measured in *calendar system* (6.1) entities, the duration of each time interval depends on the *calendar dates* (7.8) of its start and its end.

Note 2 to entry: If the starting *instants* (3.4) of time intervals are repeated according to a set of rules, the "repeat rules for recurring time intervals" in ISO 8601-2:2019, Clause 5 apply.

3.7
duration
non-negative quantity attributed to a *time interval* (3.6), the value of which is equal to the difference between the quantitative times of the final *instant* (3.4) and the initial instant of the time interval

Note 1 to entry: Duration is one of the base quantities in the International System of Quantities (ISQ) on which 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* (7.1) depends on the *time scale* (3.5) used. For example, the durations of a year, month, week, day, hour, or minute, may depend on when they occur (e.g. in a Gregorian calendar, a *calendar month* (7.21) can have a duration of 28, 29, 30, or 31 days; in a *24-hour clock system* (5.2), a *clock minute* (7.5) can have a duration of 59, 60, or 61 seconds). Therefore, the exact duration of a time scale unit can only be evaluated if the exact duration of each composing element is known.

Note 4 to entry: The SI unit of duration is *second* (7.2). Time scale units derived from the *SI second* (7.2) are acceptable for use with the SI, namely, *minute* (7.4) (1 min = 60 s), *hour* (7.6) (1 h = 60 min = 3 600 s) and *day* (7.11) (1 d = 24 h = 86 400 s). These time invariant units are used for the scales of a stopwatch with an additional scale for the number of days, if applicable.

Note 5 to entry: Realizations of the SI-second-derived units on time intervals and the differences between SI-derived units and the calendar or clock units are used to handle duration changes such as those due to *leap seconds* (4.8) and discontinuities such as those caused by the periodic changing of offsets from *UTC* (4.7) during the year. By equating *clock day* (7.12) to *calendar day* (7.13), this sequence can be continued by calendar day to *calendar year* (7.23), hence allowing UTC and its *time shifts* (3.9) to be used in a continuous manner within calendar time scales.

Note 6 to entry: This definition is closely related to NOTE 1 of "duration" in IEC 60050-113:2011, 113-01-13.

3.7.1
negative duration
duration (3.7) in the reverse direction to the proceeding *time scale* (3.5)

3.8
time of day
time (3.2) occurring within a *calendar day* (7.13)

Note 1 to entry: Generally, time of day relates to the *duration* (3.7) elapsed after the beginning of the day. However, this correlation breaks when changes occur in the *time scale* (3.5) that applies to the time of day, such as *time shifts* (3.9) and *leap seconds* (4.8).

Note 2 to entry: This definition corresponds closely with the definition of "clock time" given in IEC 60050-113:2011, 113-01-18, except that the concepts of duration and time scale are not used in this definition.

3.8.1
basis time of day
time of day (3.8) in a *basis time scale* (4.3)

3.8.2
UTC of day
time of day (3.8) in *UTC* (4.7)

3.8.3
local time of day
time of day (3.8) in a *local time* (4.6)

3.9
time shift
difference between the marks attributed to the same *instant* (3.4) between *times* (3.2) of two *time scales* (3.5)

3.10
equation of time
difference between mean solar time and apparent solar time, which varies with time within a *calendar year* (7.23)

Note 1 to entry: A wall clock, for instance, is a type of device that indicates mean solar time, while a sundial is a type of device that indicates apparent solar time.

4 Terms related to time scales

4.1
proper time scale
time scale (3.5) produced by a continuously running primary frequency standard not compensated for gravitational frequency shift

Note 1 to entry: An ideal clock, which exactly realizes the *SI second* (7.2), is a *clock system* (5.1) that is a proper time scale.

Note 2 to entry: This definition is derived from ITU-R TF.2018-0.

4.2
coordinate time scale
time scale (3.5) independent of the equations of motion of material bodies and in the equations of propagation of electromagnetic waves

EXAMPLE *TCG* (4.13), *TT* (4.12), *UTC* (4.7) and *TAI* (4.9).

Note 1 to entry: This definition is derived from ITU-R TF.2018-0.

4.3
basis time scale
time scale (3.5) established to serve as reference time by a competent authority

EXAMPLE GPS system time, Galileo system time, GLONASS system time and BeiDou system time, are examples of basis time scales established by operators of global navigation satellite systems for internal use. They differ from *UTC* (4.7) by integer hours (GLONASS), integer seconds (all other, except GLONASS) and small fractions of microseconds (all).

Note 1 to entry: UTC is the recommended basis time scale for all civil and scientific applications.

Note 2 to entry: The *local time* (4.6) in a location is often defined as UTC plus a certain *time shift* (3.9), but not necessarily in all.

4.4
standard time
time scale (3.5) derived from a *basis time scale* (4.3) with a *time shift* (3.9) established by a competent authority

EXAMPLE 1 Some standard times vary within a year, such as US Eastern Time (ET) and Australian Central Standard Time (ACST).

EXAMPLE 2 Some standard times do not vary within a year, such as US Eastern Standard Time (EST), US Eastern Daylight Time (EDT), Central European Time (CET), Central European Summer Time (CEST), Australia Western Standard Time (AWST), Korea Standard Time (KST), China Standard Time (CST), Hong Kong Standard Time (HKT) and Japanese Standard Time (JST).

Note 1 to entry: The time shift of a standard time may vary in the course of a year, as decided by the competent authority, e.g. for introducing daylight saving time.

Note 2 to entry: The *local time* (4.6) may switch between different standard times for administrative reasons, for instance, a regulatory decision to adopt a different standard time.

Note 3 to entry: Many standard times use *UTC* (4.7) as their basis and are often associated with a geographical location.

Note 4 to entry: This definition corresponds closely to, but is more general than, the definition of the term "standard time" in IEC 60050-113:2011, 113-01-17.

4.5
adjusted time
time scale (3.5) derived from a *basis time scale* (4.3) with a *time shift* (3.9), established by a competent authority that also defines a *standard time* (4.4)

EXAMPLE 1 Central European Summer Time (CEST) is an adjusted time in comparison with Central European Time (CET), a standard time.

EXAMPLE 2 US Eastern Daylight Time (EDT) is an adjusted time in comparison with US Eastern Standard Time (EST), a standard time.

4.6
local time
local time scale
time scale (3.5) applied locally of either a *standard time* (4.4) or *adjusted time* (4.5), as decided by a competent authority

EXAMPLE Local time in some locations is subject to seasonal adjustments between standard times and adjusted times. For instance, between Western European Time (WET) and Western European Daylight Time (WEDT) and between US Pacific Standard Time (PST) and US Pacific Daylight Time (PDT).

4.7
UTC
Coordinated Universal Time
time scale (3.5) produced by the International Bureau of Weights and Measures (Bureau International des Poids et Mesures, BIPM) with the same rate as *TAI* (4.9), but differing from TAI only by an integral number of *seconds* (7.2)

Note 1 to entry: UTC is the only recommended time scale as *basis time scale* (4.3) and the basis of *local time* (4.6) in most countries.

Note 2 to entry: Access to UTC is obtained through local real-time realizations $\mathrm{UTC}(k)$ maintained by laboratories contributing data to the calculation of UTC, identified by k.

Note 3 to entry: The International Earth Rotation and Reference Systems Service (IERS) decides on the insertion of *leap seconds* (4.8) in UTC and thus on the integer second offset from TAI.

[SOURCE: 26th meeting of the CGPM (2018)[10], Resolution 2, modified – The word "but" has been removed from the definition for clarity; notes 1 and 2 to entry have been updated; note 3 to entry has been added.]

4.8
leap second
intentional time step of one *second* (7.2) to adjust *UTC* (4.7) to ensure approximate agreement with *UT1* (4.10), a *time scale* (3.5) based on the rotation of the Earth

Note 1 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 is represented as [23:59:60Z], where the last second of that minute represented as [23:59:60Z]. A negative leap second is achieved by the omission of [23:59:59Z], where the last second of that minute represented as [23:59:58Z]. 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.

Note 2 to entry: See also ITU-R TF.460-6.

4.9
TAI
International Atomic Time
continuous *time scale* (3.5) produced by the International Bureau of Weights and Measures (Bureau International des Poids et Mesures, BIPM) based on the best realizations of the *SI second* (7.2)

Note 1 to entry: TAI is a realization of *TT* (4.12) with nominally the same rate as that of TT. In other words, TT is a concept, while TAI is a realized time scale.

[SOURCE: 26th meeting of the CGPM (2018)[10], Resolution 2, modified – Note 1 to entry has been expanded upon for clarity.]

4.10
UT1
Universal Time
time scale (3.5) defined by the International Astronomical Union (IAU) with reference to a fixed point on the moving equator, corresponding to the *Earth rotation angle* (4.11)

Note 1 to entry: This definition is derived from IAU Resolution B1.8 (2000)[6]: Definition and use of Celestial and Terrestrial Ephemeris Origins.

Note 2 to entry: Precise values as well as predicted values of UT1 are obtained through the publication of DUT1 ($\mathrm{UT1} - \mathrm{UTC}$) by the International Earth Rotation and Reference Systems Service (IERS).

4.11
Earth rotation angle
angle measured along the equator of the CIP between the unit vectors directed toward the CEO (Celestial Ephemeris Origin) and the TEO (Terrestrial Ephemeris Origin)

Note 1 to entry: The Earth's rotation is monitored by different means, such as VLBI, tracking of GNSS satellites and Satellite-Laser-Ranging. Data are collected and evaluated by the International Earth Rotation and Reference Systems Service (IERS).

[SOURCE: IAU Resolution B1.8 (2000)[6]: Definition and use of Celestial and Terrestrial Ephemeris Origin, modified – Note 1 to entry has been added.]

4.12
TT
Terrestrial Time
time scale (3.5) differing from *TCG* (4.13) by a constant rate $\mathrm{d}t_{\mathrm{TT}}/\mathrm{d}t_{\mathrm{TCG}} = 1 - L_G$, where $L_G = 6{,}969\,290\,134 \times 10^{-10}$ is a defining constant

Note 1 to entry: In the definition, t_{TT} represents TT and t_{TCG} represents TCG.

[SOURCE: IAU Resolution B1.9 (2000)[7]: Re-definition of Terrestrial Time TT, modified — Italicized single-letter symbols have been used to represent TT and TCG; note 1 to entry has been added.]

4.13
TCG
Geocentric Coordinate Time
time (3.2) coordinate of the Geocentric Reference System defined by the International Astronomical Union (IAU)

[SOURCE: IAU Resolution A4 (1991)[8], Recommendation III IAU Resolution A4 (1991), Recommendation III]

5 Terms related to clock systems

5.1
clock system
clock
time scale (3.5) suited for intra-day time measurements

EXAMPLE The *24-hour clock system* (5.2) is a type of clock system.

Note 1 to entry: *Clock second* (7.3), *clock minute* (7.5) and *clock hour* (7.7) are often *time scale units* (7.1) included in a clock system.

Note 2 to entry: The document uses the term "clock system" to distinguish a clock system from a clock instance that someone may place on their desk.

5.2
24-hour clock system
24-hour clock
24 h clock
clock system (5.1) that subdivides a *calendar day* (7.13) into 24 *clock hours* (7.7) with marks cyclically assigned

Note 1 to entry: *UTC* (4.7) forms the basis of today's 24-hour clock systems and is often used as a type of 24-hour clock system.

Note 2 to entry: The *clock day* (7.12) of the 24-hour clock system is 24 hours, with each mark having a one-to-one correspondence with marks in the *12-hour clock system* (5.3).

5.3
12-hour clock system
12-hour clock
12 h clock
clock system (5.1) that divides a *calendar day* (7.13) into two periods that are each subdivided into 12 *clock hours* (7.7), with marks cyclically assigned per period

Note 1 to entry: The two periods of the 12-hour clock system are typically represented using the labels “a.m.” and “p.m.” with historical and geographical variations.

Note 2 to entry: The *clock day* (7.12) of the 12-hour clock system is 24 hours, with each mark having a one-to-one correspondence with marks in the *24-hour clock system* (5.2).

6 Terms related to calendar systems

6.1
calendar system
calendar
time scale (3.5) that uses the *time scale unit* (7.1) of *calendar day* (7.13) as its basic unit

EXAMPLE The Gregorian calendar is a type of calendar system.

Note 1 to entry: *Calendar month* (7.21), *calendar year* (7.23), calendar day are time scale units often included in a calendar system.

Note 2 to entry: The document uses the term “calendar system” to distinguish a calendar system from a calendar instance that someone may hang on their wall.

Note 3 to entry: Calendar systems are defined by various authorities. Usage of particular calendar systems at a point in time or geographic location may be driven by culture or regulations.

6.2
proleptic calendar system
proleptic calendar
calendar system (6.1) derived by extending an underlying calendar system to time preceding its first *epoch* (7.32)

EXAMPLE The proleptic Gregorian calendar is used for identifying dates preceding 15 October 1582 in the Gregorian calendar.

6.3
week calendar
calendar system (6.1) that uses the *calendar week* (7.18) as its basic unit and based on an unbounded series of contiguous calendar weeks

6.4
sub-year grouping
grouping composed of *time scale unit* (7.1) of a lower order than the *calendar year* (7.23) time scale unit

6.4.1
normal sub-year grouping
sub-year grouping (6.4) where the *durations* (3.7) of its elements sum up to the duration of one calendar year

EXAMPLE 1 The bimonthly *time scale unit* (7.1) 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* (6.5) in the commonly used four-season calendar 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.

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

6.5
season
element of a *normal sub-year grouping* (6.4.1), amongst which the transition between each element can be based on calendrical, meteorological, astronomical, solar or ecological events

6.6
tropical year
solar year
time (3.2) taken for the Earth to make one revolution around the Sun, as measured by the Sun's position as observed from the Earth

Note 1 to entry: The tropical year is commonly the time between two successive equivalent equinoxes or solstices, which is also the *time interval* (3.6) required for the ecliptic longitude of the Sun to increase 360 degrees with respect to the Earth.

Note 2 to entry: The tropical year differs from the *sidereal year* (6.7) due to the precession of the equinoxes.

6.7
sidereal year
time (3.2) taken for the Earth to make one revolution around the Sun, as measured by the Sun's position as observed with respect to the fixed stars

Note 1 to entry: The sidereal year differs from the *tropical year* (6.6) due to the precession of the equinoxes.

6.8
sidereal month
time (3.2) taken for the Moon to make one revolution around the Earth, as measured by the Earth's position as observed with respect to the fixed stars

6.9
synodic month
lunar month
lunation
time (3.2) taken between two successive new moons or full moons, a full cycle of the phases of the Moon, which is the time taken for the Moon to return to the same syzygy (the approximately linear configurations of the Sun and Earth), in conjunction or opposition

Note 1 to entry: The exact length of each synodic month varies because the orbit of the Moon is elliptical.

6.10
solar day
time interval (3.6) separating two passages of the Sun over the meridian, due to rotation of the Earth

Note 1 to entry: The *duration* (3.7) of each solar day approximates 24 hours in the *24-hour clock system* (5.2), but is not equivalent to the duration of the *calendar day* (7.13) due to variability in rotation of the Earth.

Note 2 to entry: The solar day is a variable concept as location approaches the poles of the Earth.

6.11
tropical solar calendar
calendar system (6.1) organising days based on a *tropical year* (6.6)

EXAMPLE The Gregorian calendar is a tropical solar calendar that is widely used.

6.12
sidereal solar calendar
calendar system (6.1) of organising days based on a *sidereal year* (6.7)

6.13
lunar calendar
calendar system (6.1) of organising days based on the phases of the Moon

EXAMPLE The Islamic calendar is a lunar calendar.

6.14
tropical lunisolar calendar
calendar system (6.1) of organising days based on the phases of the Moon, but aligned to a *tropical solar calendar* (6.11) using *intercalation* (6.16) rules

EXAMPLE The traditional Chinese calendar is a tropical lunisolar calendar.

6.15
sidereal lunisolar calendar
calendar system (6.1) of organising days based on the phases of the Moon, but aligned to a *sidereal solar calendar* (6.12) using *intercalation* (6.16) rules

EXAMPLE The Hindu calendar is a sidereal lunisolar calendar.

6.16
intercalation
offset or alteration of an element of a *calendar system* (6.1) with respect to the other elements within that calendar system to re-align the repeating patterns of a calendar system with events

EXAMPLE 1 The *UTC* (4.7) clock uses the *leap second* (4.8) mechanism as an intercalation.

EXAMPLE 2 The traditional Chinese calendar system uses the twenty-four solar terms for its intercalation.

7 Terms related to time scale units

7.1
time scale unit
unit of measurement of a *duration* (3.7)

EXAMPLE 1 *Calendar year* (7.23), *calendar month* (7.21), *calendar day* (7.13) are time scale units of the Gregorian calendar.

EXAMPLE 2 *Clock hour* (7.7), *clock minute* (7.5), *clock second* (7.3) are time scale units of the *24-hour clock system* (5.2).

7.2
second
SI second
s
base unit of *duration* (3.7) measurement in the International System of Units (SI)

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

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

7.3
clock second
calendar second
time scale unit (7.1) whose *duration* (3.7) represents one *second* (7.2) within the defined *clock system* (5.1)

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.

Note 2 to entry: Different specific clock seconds within clock systems and *calendar systems* (6.1) may have different lengths, as measured in *SI seconds* (7.2) (e.g. where *leap seconds* (4.8) occur). For instance, some information systems implement “smear seconds” that distributes the duration of a leap second over a longer *time interval* (3.6) by extending the duration of clock seconds within that time interval, in order to keep the quantity of clock seconds unchanged.

7.4
minute
min
duration (3.7) of 60 *seconds* (7.2)

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

7.5
clock minute
calendar minute
time scale unit (7.1) whose *duration* (3.7) represents one *minute* (7.4) within the defined *clock system* (5.1)

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.

Note 2 to entry: Different specific clock minutes within clock systems and *calendar systems* (6.1) may have different lengths, as measured in *SI seconds* (7.2) (e.g. where leap seconds occur).

Note 3 to entry: In the *UTC* (4.7) clock system, the duration of a minute is 60 seconds except if modified by the insertion or deletion of a *leap second* (4.8).

7.6
hour
h
duration (3.7) of 60 *minutes* (7.4)

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

7.7
clock hour
calendar hour
time scale unit (7.1) whose *duration* (3.7) represents one *hour* (7.6) within the defined *clock system* (5.1)

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.

Note 2 to entry: Different specific clock hours within clock systems and *calendar systems* (6.1) may have different lengths, as measured in *SI seconds* (7.2) (e.g. where leap seconds occur).

7.8
calendar date
particular *calendar day* (7.13) represented by its *calendar year* (7.23), its *calendar month* (7.21) and its *calendar day of month* (7.15)

7.9
ordinal date
particular *calendar day* (7.13) represented by its *calendar year* (7.23) and its *calendar day of year* (7.16)

7.10
week date
particular *calendar day* (7.13) represented by its *calendar year* (7.23) to which its *calendar week* (7.18) belongs, its *calendar week of year* (7.19) and its *calendar day of week* (7.14)

7.11
day
duration (3.7) of a *calendar day* (7.13)

Note 1 to entry: The term "day" applies also to the duration of any *time interval* (3.6) which starts at a certain *time of day* (3.8) 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.

7.12
clock day
time scale unit (7.1) whose *duration* (3.7) represents that of a *calendar day* (7.13) within the defined *clock system* (5.1)

EXAMPLE A clock day in the *24-hour clock system* (5.2) is represented by a *time interval* (3.6) of a duration of 24 hours.

Note 1 to entry: Some clock systems are cyclic, while others are monotonic. For instance, a clock day in the 24-hour clock system is represented by a single measurement cycle.

Note 2 to entry: A clock day in the 24-hour clock system represents 86 400 seconds except when modified, for instance, by insertion of leap seconds.

Note 3 to entry: The insertion or deletion of time intervals as may be prescribed by local authorities do not modify clock day. The reason being that the duration of a clock day is only dependent on the underlying clock system, therefore the clock day of two clock systems that operate at different *time shifts* (3.9) are identical.

7.13
calendar day
time scale unit (7.1) starting at the beginning of the day and ending with the beginning of the next day within the defined *calendar system* (6.1)

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 beginning of the next day in the definition refers to the starting *instant* (3.4) of the next calendar day.

Note 3 to entry: The *duration* (3.7) of a calendar day using the *24-hour clock system* (5.2) is 24 *hours* (7.6); except if modified by:

— the insertion or deletion of *leap seconds* (4.8), by decision of the International Earth Rotation and Reference Systems Service (IERS); or

— the insertion or deletion of other *time intervals* (3.6), as may be prescribed by local authorities to alter the *time scale* (3.5) of *local time* (4.6).

7.14
calendar day of week
identified *calendar day* (7.13) amongst the sequence of days within a *calendar week* (7.18)

Note 1 to entry: Days in a calendar week are often named or identified by its ordinal number, depending on the *week calendar* (6.3).

7.15
calendar day of month
ordinal number of a *calendar day* (7.13) within a *calendar month* (7.21)

7.16
calendar day of year
ordinal number of a *calendar day* (7.13) within a *calendar year* (7.23)

7.17
week
duration (3.7) of a *calendar week* (7.18)

Note 1 to entry: The term "week" applies also to the duration of any *time interval* (3.6) which starts at a certain *time of day* (3.8) at a certain *calendar day of week* (7.14) and ends at the same time of day at the same calendar day of week in the next calendar week.

7.18
calendar week
time scale unit (7.1) composed of a fixed sequence of *calendar days* (7.13)

Note 1 to entry: The calendar week is the basic time scale unit of a *week calendar* (6.3).

7.19
calendar week of year
ordinal number of a *calendar week* (7.18) within a *calendar year* (7.23) in a *week calendar* (6.3)

7.20
month
duration (3.7) of a *calendar month* (7.21)

Note 1 to entry: The term "month" applies also to the duration of any *time interval* (3.6) which starts at a certain *time of day* (3.8) at a certain *calendar day* (7.13) 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.

7.21
calendar month
time scale unit (7.1) resulting from a defined division of a *calendar year* (7.23), each containing a specific number of *calendar days* (7.13)

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.

7.22
year
duration (3.7) of a *calendar year* (7.23)

Note 1 to entry: In the Gregorian calendar, a year has 365 or 366 *days* (7.11). The duration is 366 days if the corresponding *time interval* (3.6) begins February 28 or earlier in a leap year 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 which starts at a certain *time of day* (3.8) at a certain *calendar date* (7.8) 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.

7.23
calendar year
time scale unit (7.1) defined by the *calendar system* (6.1)

7.24
decade
time scale unit (7.1) of 10 *calendar years* (7.23), 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* (3.7) of 10 years; however decade is not used as such in this document.

7.25
century
time scale unit (7.1) of 100 *calendar years* (7.23) *duration* (3.7), beginning with a year whose year number is divisible without remainder by 100

EXAMPLE The “19th century” covers the years 1800 through 1899.

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.

7.26
millennium
time scale unit (7.1) of 1000 *calendar years* (7.23) *duration* (3.7), beginning with a year whose year number is divisible without remainder by 1 000

EXAMPLE 1 The “first millennium” covers the years 0 through 999.

EXAMPLE 2 The “second millennium” covers the years 1000 through 1999.

Note 1 to entry: Millennium is also used to refer to an arbitrary duration of 1 000 years; however millennium is not used as such in this document.

7.27
calendar era
named sequence of *time intervals* (3.6) used in a *calendar system* (6.1) defined by an *epoch* (7.32)

EXAMPLE Japanese calendar era Reiwa.

Note 1 to entry: Calendar eras do not necessarily form a contiguous or non-overlapping sequence.

Note 2 to entry: A calendar era typically references a time interval of more than one year, but could also reference a time interval shorter than one year.

7.28
calendar era year
representation to a *calendar year* (7.23) located within a *calendar era* (7.27)

EXAMPLE Calendar era year 1 in the Reiwa calendar era of Japan.

7.29
epoch
instant (3.4) in *time* (3.2) chosen as the origin of a *calendar era* (7.27)

EXAMPLE The epoch of the Gregorian year is defined as year 1, which began on 15 October 1582 of the Julian calendar.

7.30
epoch
<computing> *time* (3.2) at which the representation is zero

EXAMPLE Unix time is represented as the number of *seconds* (7.2) since 1 January 1970 in the Gregorian calendar, 00:00:00 in *UTC* (4.7). Unix time does not count *leap seconds* (4.8) as defined by UTC.

7.31
epoch
<astronomy> reference time used for consistency in calculation of positions and orbits

EXAMPLE A common astronomical epoch is J2000, which is noon on January 1, 2000, *TT* (4.12).

7.32
epoch
<geochronology> named *time interval* (3.6), typically in the order of tens of millions of years

EXAMPLE The current geochronological epoch is the Holocene.

7.33
approximate date
calendar date (7.8) 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.

7.34
uncertain date
calendar date (7.8) whose source is considered dubious

7.35
date with unspecified part
calendar date (7.8) of which a part is unstated

Note 1 to entry: The unstated part can be *year* (7.22), year and *month* (7.20), month, month and *day* (7.11), or year and day. It is unstated because it has not (yet) been assigned (it can be assigned in the future), or because it is classified, or unknown, or for any other reason.

7.36
movable day
repeatedly occurring *calendar date* (7.8) in a *calendar system* (6.1) that is represented by criteria set by one or more *selection rules* (8.10), but does not always resolve to a fixed calendar date in every repeating cycle

EXAMPLE 1 Thanksgiving Day in the USA 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.

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

8 Terms related to expressions and representations

8.1
date and time expression
expression indicating a *time* (3.2), *time interval* (3.6) or *recurring time interval* (3.6.5)

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

8.2
date and time representation
representation of the format of one or more *date and time expressions* (8.1)

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.

8.3
time scale component
representation of a *time scale unit* (7.1) within a *date and time expression* (8.1) or a *date and time representation* (8.2)

EXAMPLE 1 *calendar year* (7.23), *calendar month* (7.21), *calendar day* (7.13), *clock hour* (7.7), *clock minute* (7.5), *clock second* (7.3) are time scale components of a *complete representation* (8.4).

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.

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* (3.6) 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.

8.4
complete representation
date and time representation (8.2) that includes all the *time scale components* (8.3) associated with the *date and time expression* (8.1)

8.5
feature
single function or group of functions

8.6
conformity level
value assigned to a subset of *features* (8.5) within a *profile* (8.7)

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

8.7
profile
subset of *features* (8.5) 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* (8.6).

8.8
ISO 8601 profile
profile (8.7) whose base standard is the ISO 8601 series

8.9
repeat rule
set of *eligible time intervals* (8.12) and *selection rules* (8.10) that allows computation of a set of *matching instants* (8.13)

8.10
selection rule
rule specifying restrictions on the value of a *time scale component* (8.3)

8.11
repeat cycle
set of repeating *instants* (3.4), calculated by a specified start instant and specified *duration* (3.7) gap between the repeating instants

8.12
eligible time interval
time interval (3.6) eligible for matching using *selection rules* (8.10)