Bibliographic Datetime Format (BDF)

1 Quick Reference

The following is a list of VALID example representations stipulated by this Bibliographic Datetime Format (BDF) standard.

Curly braces, {}, designate a VALID but DISCOURAGED example. The curly braces MUST NOT be output. Strikeouts are double tilde (~~) delimited.

```
# Overriding date-and-time separator rule
 2019-02-28 18:34:01             // Date-and-time, space separated. ENCOURAGED.
{2019-02-28T18:34:01}            // Date-and-time, "T" separated. DISCOURAGED.

# Overriding timezone designator separator rule
2019-02-28 18:34:01 Z            // Timezone space separator. ENCOURAGED.
2019-02-28 18:34:01 +11:00       // Timezone space separator. ENCOURAGED.
2019-02-28 18:34:01 +11          // Timezone space separator. ENCOURAGED.
1982-11-30 07:42:56 -05:00       // Timezone space separator. ENCOURAGED.

{2019-02-28T18:34:01Z}           // Timezone no separator. DISCOURAGED.
{2019-02-28T18:34:01+11:00}      // Timezone no separator. DISCOURAGED.
{2019-02-28 18:34:01+11}         // Timezone no separator (with date-and-time space
sep.) DISCOURAGED.
{1982-11-30 07:42:56-05:00}      // Timezone no separator (with date-and-time space
sep.) DISCOURAGED.

# Extended format (with hyphen and colon separators) only rule
2019-02-28 18:34:01 +11:00       // Extended format
2019-02-28 18:34                 // Extended format
2019-02                          // Extended format

# Reduced precision rule
2019-02-28 18:34:01 +11:00       // With timezone.
2019-02-28 18:34:01 +11          // With timezone, offset hour precision.
2019-02-28 18:34 +11:00          // With timezone, offset minute precision. Time minute
precision.
2019-02-28 18 +11:00             // With timezone, offset minute precision. Time hour
precision.

2019-02-28 18:34:01              // Without timezone. Time second precision.
2019-02-28 18:34                 // Without timezone. Time minute precision.
2019-02-28 18                    // Without timezone. Time hour precision.

2019-02-28               // Day precision.
2019-02                  // Month precision.
2019                     // Year precision.

# Date rule
2019-02-28               // A day.
2019-02                  // A month.
2019                     // A year.

# Plus or minus year symbol rule
  2019                   // Positive year, no plus sign. ENCOURAGED.
  0125                   // Positive year, not long after the year zero, no plus sign.
ENCOURAGED.
```

```
{+2019}                  // Positive year, plus sign. DISCOURAGED.
{+0125}                  // Positive year, plus sign. DISCOURAGED.

 -0379                   // Negative year, minus sign, REQUIRED.

# Zero year rule
  0000                   // Year zero, ENCOURAGED.
{+0000}                  // Year zero, DISCOURAGED.

# Astronomical calendar rule
 0125                    // 125 CE. Not long after the year zero.
 0001                    //   1 CE.
 0000                    // The year zero, or 1 BCE.
-0001                    //   2 BCE.
-0379                    // 380 BCE.

# Overriding years exceeding four digits rule

## Without mutual consent (with "Y")
  Y52000           // Positive year 52,000, no plus sign. ENCOURAGED.
{Y+52000}          // Positive year 52,000, plus sign. DISCOURAGED.

 Y-51234           // Negative year 51,235 BCE, minus sign. REQUIRED.

  Y52000-02-28     // Day precision.
  Y52000-02        // Month precision.

  Y52000-02-28 18:34:01 +11:00    // Years exceeding four digits with date-and-time.

# No time only rule

# Time rule
2019-02-28 18:34:01       // Hours, minutes, seconds. Second precision.
2019-02-28 18:34          // Hours, minutes. Minute precision.
2019-02-28 07:42          // Hours, minutes. Leading zero for hour.

# Date-and-time rule
  2019-02-28 18:34:01     // Date-and-time, " " separated. Positive ENCOURAGED.
  2019-02-28 18:34        // Date-and-time, minute precision. Positive ENCOURAGED.

{+2019-02-28 18:34:01}    // Date-and-time, " " separated. Positive DISCOURAGED.
{+2019-02-28 18:34}       // Date-and-time, minute precision. Positive DISCOURAGED.

 -0379-02-28 18:34:01     // Date-and-time, negative years (380 BCE) with second
precision.

# Timezone designator rule.
2019-02-28 18:34:01 Z             // Date-and-time, with timezone - Zulu = Universal
Time Co-ordinated.

2019-02-28 18:34:01 +11:00        // Date-and-time, with timezone offset - long form.
2019-02-28 18:34:01 +11           // Date-and-time, with timezone offset - short form.
1982-11-30 07:42:56 -05:00        // Date-and-time, with timezone offset - long form,
negative.

2019-02-28 18:34 +11:00           // Date-and-time, with timezone offset. Time minute
precision.

# Beginning of day rule
2019-02-28 00:00:00       // The beginning of 28th Feb 2019. Second precision.
2019-02-28 00:00          // The beginning of 28th Feb 2019. Minute precision.
2019-02-28 00             // The beginning of 28th Feb 2019. Hour precision.

2019-02-28 00:00 +11:00   // The beginning of 28th Feb 2019, at a specific timezone.

# Absent timezone designator rule
```

```
2019-02-28 18:34          // A local datetime, having either: an obvious timezone; or an
indeterminate timezone.

# Season rule
2019-21                   // Spring of 2019.
2019-22                   // Summer of 2019.
2019-23                   // Autumn of 2019.
2019-24                   // Winter of 2019.

# Unspecified rule
2019-02-XX
2019-XX-XX
XXXX-XX-XX
2019-XX
XXXX-XX
198X
20XX
XXXX

# Deleting Century rule
~~19               // The twentieth century~~

# Extending Quarters rule
2019-Q2            // The second quarter of 2019.
Q2                 // The second quarter.
1982-Q4-XX         // A year-quarter, with the day unspecified. Some day in the quarter.

# Overriding qualification (approximate, uncertain, and approximate-and-uncertain)
applicability rule
2019-02-28 18:34:01 +11:00~       // Qualification of date-and-time with timezone
designator.
2019-02-28 18:34:01?      // Qualification of date-and-time. Second precision.
2019-02-28 18:34%         // Qualification of date-and-time. Minute precision.
2019-02-28 18~            // Qualification of date-and-time. Hour precision.

2019-02-28?               // Qualification of date. Day precision.
2019-02%                  // Qualification of date. Month precision.
2019~                     // Qualification of date. Year precision.

2019-Q2?                  // Qualification of quarter.
2019-24%                  // Qualification of season.

# Approximate rule
1590~              // Approximate. Often output with the circa abbreviation, as in "ca.
1590".
2019-02-28~        // Approximate. Day precision.

# Uncertain rule
1256?              // Uncertain.
2019-02?           // Uncertain. Month precision.

# Approximate and uncertain rule
1273%              // Approximate-and-uncertain
2019-02%           // Approximate-and-uncertain. Month precision.

# Overriding interval rule
1982-11-30 07:42:56 -05:00/2019-02-28 18:34:01 +11:00  // Between date-and-times.
1982-21/2019-22                                        // Between seasons.
2019-Q1/2019-Q3                                        // Between quarters.

1982-11-30/2019-02-28     // Between dates with day precision.
1982-11/2019-02           // Between dates with month precision.
1487/1490                 // Between two years.
1982-11-30/2019           // Between two dates, with asymmetric precision.
```

```
Y-51234-11-30/Y52000      // Between two dates with years exceeding four digits.

1982-11-30~/2019-02-28?   // Qualified dates at either end.
1982-11-30/2019%   // Qualified dates at one end.

# Unknown in interval rule
/1490              // Start datetime unknown.
1982-11/           // End datetime unknown.
/                  // Both datetimes unknown.

# Open in interval rule
../1490            // Start datetime open.
1982-11/..         // End datetime open.
../..              // Both datetimes open.

# Mixed unknown and open in interval rule
/..                // Start datetime unknown, end datetime open.
../                // Start datetime open, end datetime unknown.
```

2 Meta

2.1 Table of contents

Open your PDF reader's "bookmark" viewer (the heading hierarchy viewer).

2.2 Overview

2.2.1 What is it?

Bibliographic Datetime Format (BDF) is a standard of formats to represent datetimes: a date, a time, a date-and-time, a season, an unspecified, a century, a qualified (approximate, uncertain, or approximate-and-uncertain), an interval, etc.

2.2.2 Aims

The formats stipulated by Bibliographic Datetime Format (BDF) are chosen to satisfy the following aims:

1. Relevancy in a bibliographic context, as when citing or cataloguing books, films, articles, blog posts, tweets, web pages, legal statutes, legal cases, etc.
2. Format handling kinds (to coin a phrase) that:
   - Work well as an input, storage, and output format. That is, because the format is both human readable and machine parsable. E.g. `2019-02-28 18:34:01 +11:00` works well in all three contexts; then, failing that,
   - Work well as a storage format. E.g. A software system might permit (a non BDF) `380 BCE` (or `380 BC`, or `-0379`) input, store this as a BDF VALID `-0379`, and output this as (a non BDF) `380 BCE` (or `380 BC, or -0379`), depending on user preferences. That is, `-0379` works well stored but not input or output as most users aren't aware of, let alone used to, the traditional calendar to astronomical calendar conversion.
3. As far as practical be consistent with (|ISO/DIS 8601:2016(e)|) in promoting global use, so as to avoid ambiguities created by customary regional formats. E.g. by using `2018-06-07` in lieu of `06/07/18`;
4. Constitute a smaller set than (|ISO/DIS 8601:2016(e)|), with some OVERRIDING, and EXTENDING exceptions. Noting "ISO 8601 describes a large number of date/time formats. To reduce the scope for error and the complexity of software, it is useful to restrict the supported formats to a small number" from (|W3C Note: Date and Time Formats|), and quoted in (|ISO/DIS 8601-2:2016(e)|, 26, sec. Annex B (normative) ISO 8601 profiles > B.2 Some historical background);
5. As far as practical stipulate either: one VALID format; or, failing that, an ENCOURAGED format, where multiple options are available for a representation;

Although these formats will be relevant in a Bibliographic context their use in other contexts is encouraged, if suitable.

2.2.3 Relationship to other standards

The Bibliographic Datetime Format contains "The Bibliographic ISO 8601 profile (BP)", an ISO 8601 profile of another ISO 8601 profile: (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|). In addition, Bibliographic Datetime Format has "The Bibliographic Standard-Transformation" with respect to the Bibliographic ISO 8601 profile (BP), which results in the formats stipulated by "Bibliographic Datetime Format" overall.

The Bibliographic Datetime Format, taken as a whole, is not an ISO 8601 profile.

The Bibliographic Datetime Format directly interprets and transforms (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e) 2016-10-26|), and therefore the containing (|ISO/DIS 8601:2016(e)|), which incorporates and obsoletes:

|EDTF:LOC| Library of Congress. 2012. "Extended Date/Time Format (EDTF) 1.0 Draft Submission". http://www.loc.gov/standards/datetime/pre-submission.html. 2012-01-13. (Strictly the “Library Of Congress” hosts the standard rather than being the author).

That is, Bibliographic Datetime Format's heritage is rooted in (|EDTF:LOC|) and continues its spirit.

2.2.4 Openness and liberty

The Bibliographic Datetime Format is open and provides liberty through (*todo: insert licence). Copies are available without cost at (*todo: insert url).

2.3 External considerations

2.3.1 Conformance types

Conformance types metarule. To describe how a target rule in a target standard stands in relation to a source rule in a source standard, or how the target rule stands in relation to a source standard overall, there will be the following five conformance types: CONFORMS; DISAMBIGUATES; DELETES; OVERRIDES; and EXTENDS. For conformance type purposes profiles and transformations (of standards) will be also regarded as a standard.

Word variations on the base conformance type word may be used (e.g. "OVERRIDES", " OVERRDING", "OVERRIDEN", etc.). Conformance types must be written in ALL CAPS.

Conformance types have the following meanings:

- **CONFORMS**: The source rule is unambiguous. The target rule repeats it, probably using different words and examples.
- **DISAMBIGUATES**: The source rule is ambiguous. The target rule comes down on one side of the ambiguity.
- **DELETES**: A source rule, or part of a source rule, is dropped from the target standard.
- **OVERRIDES**: The target rule contradicts and supersedes the source rule.
- **EXTENDS**: The target rule adds a feature or format not found in the source standard.

For example, the Bibliographic ISO 8601 profile *Dates rule,* a target rule, "CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 28–29, sec. C.4.1 Date)". For another example, The

> Bibliographic Standard-Transformation *Extending quarters rule* "EXTENDS the Bibliographic ISO 8601 profile".

2.3.2 Conformance types to ISO 8601 Profile mapping

The definition of an ISO 8601 profile as stipulated in (|ISO/DIS 8601-2:2016(e)|, 26–27, sec. Annex B (Normative) ISO 8601 Profiles). We map conformance types to this stipulation as follows ...

> A Profile of ISO 8601 is a specification developed by a particular community which explains how ISO 8601 is to be used, to carry out a particular function or group of functions relevant to that community.
>
> 1. It may list features of 8601 to be supported [CONFORMS with].
> 2. In cases where there are multiple methods specified in 8601 to support a particular function, the profile may select a single method [DELETES].
> 3. In cases where there are different interpretations of a particular function, the profile may select a single interpretation, or provide clarification [DISAMBIGUATES].
> 4. It might list features that are not relevant and need not be supported [DELETES]. ...

Note, therefore, an ISO 8601 Profile can't OVERRIDE or EXTEND (|ISO/DIS 8601:2016(e)|).

2.3.3 Generalizing the concept of a Standard-Transformation

"A Standard-Transformation" is the application of any number of the conformance types (CONFORMS; DISAMBIGUATES; DELETES; OVERRIDES; and EXTENDS) to transform one standard into another. A Standard-Transformation is, therefore, like an ISO 8601 Profile on steroids.

Bibliographic Datetime Format uses a Standard-Transformation, called "The Bibliographic Standard-Transformation", or "The Transformation" for short, to transform the Bibliographic ISO 8601 Profile (a standard) into the Bibliographic Datetime Format overall (another standard).

However, persons or communities may avail themselves of a Standard-Transformation to operate on any other datetime standard (or non-datetime standard for that matter), such as Bibliographic Datetime Format overall, or ISO 8601:2016.

No approval is necessary to create and publish a Standard-Transformation; any person or community can develop a Standard-Transformation. The only constraint is that it (and the resulting standard) be named so it is not confused with any existing standard.

{BDF does not divide its rules into levels.

An argument in favour of levels is that it provides a safety value for otherwise intractable disagreements between standards authors about what should be included. A compromise could be reached by relegating the proposed format to a higher level (like "level 2").

However, a Standard-Transformation might be useful in providing a similar safety value, in lieu of levels. So the contested format could be excluded from BDF and allowed to flourish under the transformed standard.}

2.3.4 Relationship to other standards

2.3.4.1 Overview

This Bibliographic Datetime Format (BDF) has rules divided into two sections:

1. "The Bibliographic ISO 8601 profile", "BP" for short, an "ISO 8601 profile"; and
2. "The Bibliographic Standard-Transformation", or "The Transformation" for short, which is an instance of "A Standard-Transformation". This results in the formats stipulated by "Bibliographic Datetime Format" overall, "BDF" for short.

2.3.4.2 The Bibliographic ISO 8601 Profile (BP)

The Bibliographic ISO 8601 Profile is an ISO 8601 profile of another ISO 8601 profile: (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|).

(|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|), because it is also an ISO 8601 profile, stands in relation to the larger standard(s) which contain it: (|ISO/DIS 8601-1:2016(e)|) and (|ISO/DIS 8601-2:2016(e)|).

Because the Bibliographic ISO 8601 Profile stands in relation to (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) it also stands (indirectly) in relation to (|ISO/DIS 8601-1:2016(e)|) and (|ISO/DIS 8601-2:2016(e)|). So sometimes the Bibliographic ISO 8601 Profile rules have a conformance type with regard to those later two standards.

The Bibliographic ISO 8601 Profile only uses the ISO 8601 profile rules 1 (CONFORMS with) and 3 (DISAMBIGUATES) with regard to rules in (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|).

The Bibliographic ISO 8601 Profile, moreover, aims to provide the closest possible interpretation of the intentions of the authors of (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|), consistent with providing a coherent standard. The Bibliographic ISO 8601 profile, in that sense, attempts to track (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|).

Where (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) contradicts IS0/DIS 8601:2016 overall, then (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) OVERRIDES it. Therefore where (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) contradicts IS0/DIS 8601:2016 overall, The Bibliographic ISO 8601 Profile follows (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|).

2.3.4.3 Levels

The Bibliographic ISO 8601 Profile tracks (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) to level 1. Bibliographic Datetime Format (neither The Bibliographic ISO 8601 profile nor The Bibliographic Standard-Transformation) does not, itself, divide rules into levels.

2.3.4.4 The Bibliographic Standard-Transformation

The Bibliographic Standard-Transformation ("The Transformation") contains rules with the conformance types: DELETING, OVERRIDING and EXTENDING. These apply directly with respect to the preceding Bibliographic ISO 8601 Profile, not directly to (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|).

2.3.4.5 Format handling kinds

In terms of format handling kinds (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|), by contrast with BDF, privileges formats that work well as a storage format. For example, in promoting a format without space separators, as in `2019-02-28T18:34:01+11:00`. Something less human readable.

2.3.5 Conformance requirement

To claim conformance with Bibliographic Datetime Format it MUST be taken as a whole. Taken as a whole Bibliographic Datetime Format is not itself an ISO 8601 profile. That is, "Bibliographic ISO 8601 Profile" is a subset of the whole "Bibliographic Datetime Format"; and "Bibliographic ISO 8601 Profile" MUST NOT be used alone (to claim conformity with Bibliographic Datetime Format).

{Perhaps there needs to be an additional explicit note about it being OK to use the Bibliographic ISO 8601 Profile alone ... constituting conformity with that profile rather than BDF overall}.

It is not required that a product using Bibliographic Datetime Format do so exclusively. For example a piece of software might choose to support: Bibliographic Datetime Format plus some or all of the level 2 features from (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|); or Bibliographic Datetime Format plus (a hypothetical future) "Geological Datetime Format".

2.3.6 ISO and copyright

ISO retains the copyright to their standards (|ISO/DIS 8601-1:2016(e)|; |ISO/DIS 8601-2:2016(e)|; |ISO 8601:2004|).

However, ISO explicitly permits the publication of an "ISO 8601 profile" without explicit approval:

> A Profile of ISO 8601 is a specification developed by a particular community which explains how ISO 8601 is to be used, to carry out a particular function or group of functions relevant to that community. ... **It is not intended that 8601 profiles be approved by any formal body; any person or community can develop a profile** [Strength added]. (|ISO/DIS 8601-2:2016(e)|, 26–27, sec. B.3 Generalizing the concept of an ISO 8601 profile)

2.3.7 Attribution

The Bibliographic Datetime Format is directly derived from (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) which incorporates and obsoletes:

|EDTF:LOC| Library of Congress. 2012. "Extended Date/Time Format (EDTF) 1.0 Draft Submission". http://www.loc.gov/standards/datetime/pre-submission.html. 2012-01-13. (Strictly the “Library Of Congress” hosts the standard rather than being the author).

So Bibliographic Datetime Format's heritage is rooted in (|EDTF:LOC|) and continues its spirit.

Thanks, then, to the fine work done by the authors of the following (in chronological order) ...

- (|ISO 8601:2004|).
- (|EDTF:LOC|).
- (|ISO/DIS 8601-1:2016(e)|; |ISO/DIS 8601-2:2016(e)|), collectively (|ISO/DIS 8601:2016(e)|).

2.3.8 Why another datetime standard?

In a subject area benefited by a standard the ideal is to have one standard. Why, then, create another standard in the same area that (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|), and (|ISO/DIS 8601:2016(e)|) overall, covers?

(|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) and the containing (|ISO/DIS 8601:2016(e)|), are like most standards created by ISO: they are closed. Closed in:

- Proposals, big or small, for improving the standard are not accessible to all (without going through an elaborate membership application that may or may not be approved).
- Distribution of the standard is too restricted.
- Having a paywall in front of development and released versions.

Additionally, (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) and (|ISO/DIS 8601:2016(e)|) have particular problems. Despite many of the rules being well written and helpfully terse: they are ambiguous in places, and even when unambiguous, difficult to follow in virtue of the overall structure of the documents, and of the presentation of the rules.

The Bibliographic Datetime format aims to remedy the lack of clarity, the ambiguity, and the closed character.

2.3.9 Openness and liberty

The Bibliographic Datetime Format is open and provides liberty in that:

- Everyone will be able to make suggestions for its improvement.
- Everyone will be allowed to distribute the standard (with attribution).
- Everyone will be allowed to copy the standard, make independent modifications to it, and distribute that modified version (with attribution).
- Everyone will be allowed to use the standard for open or closed (proprietary) software.
- Everyone will be able to access the development and release versions without cost.

But:

- If a person or organisation distributes the standard, or a modified version (of the standard), they can't deny others the right to distribute the standard, or the modified version (of the standard).

To preserve those liberties and that openness the Bibliographic Datetime Format is developed and released under (*todo: specific Open/Libre license*).

{As a lynch pin for this: John Bentley asserts copyright over the current document}.

2.4 Internal considerations

2.4.1 Document versioning

Document versioning metarule. This document uses semantic versioning (|Semantic Versioning 2.0.0|), with the following (CONFORMING) stipulations:

- "2. A normal version number MUST take the form X.Y.Z where X, Y, and Z are non-negative integers, and MUST NOT contain leading zeroes. X is the major version, Y is the minor version, and Z is the patch version. Each element MUST increase numerically. For instance: 1.9.0 -> 1.10.0 -> 1.11.0. (|Semantic Versioning 2.0.0|, under “Semantic Versioning Specification (SemVer)”)".
- MAY have pre-release extensions [`-draft|-rc.N`], where `N` is an integer. A "released" document omits `-draft` or `-rc.N`; and
- MUST have a build metadata comprising a plus "`+`" prefixed date-and-time stamp formatted as YYYYMMDDTHHMM (an ISO 8601:2016 "Basic format", which happens to be BDF INVALID).

```
MAJOR.MINOR.PATCH[-draft|-rc.N]+YYYYMDDTHHMM    // N is an integer

0.1.112-draft+20190604T2123       // A draft document.
1.0.0-rc.9+20190821T1753          // Release candidate 9.
1.0.12+20191001T0725              // A released document.
```

Such version strings can be appended to file names, should the need arise, without an OS complaining (at least this is true for Windows).

2.4.2 Status

This standard is in (very early) draft and liable to change radically. Don't use it, yet, for guiding your software implementations.

2.4.3 Feedback

Feedback is welcome to be given at https://github.com/JohnLukeBentley/open-datetime-standard-bootstrap/issues (at the moment we are narrowly focused on feasibility ... whether we ought create and promulgate this standard, or not).

2.4.4 Key

2.4.4.1 General

This is text is for general narration.

> This is a quote in the flow of general narration.

More general narration lorem ipsum ...

{Editor's note in curly brackets, {}, italics, and red. An editor's note is a note about this document that will not appear in the released version}.

2.4.4.2 Rule

Rule name. The rule text is in plain English.

```
YYYY-MM-DD          // The rule expressed in datetime metasyntax.

// Examples of a VALID Bibliographic ISO 8601 profile (BP) format.
2019-02-28T18:34:01Z              // Comment on what this illustrates.

// Strikeouts are double tilde "~~" delimited (this is github markdown code)
```

```
~~20              // Century precision.~~
```

```
// Examples of a VALID Bibliographic Datetime Format (BDF).
2019-02-28 18:34:01 Z            // Comment on what this illustrates.

Examples of an INVALID format (introduced as "Invalid"):
23rd Mar 2019
```

Rule explication (if necessary). Note all examples, VALID and INVALID, are regarded as canonical. That is, part of the rule: potentially making clear the rule text.

> This is a quote within a rule explication.

Rule conformance note. Expresses a conformance type with respect to a source rule, or a source standard. Includes an explication of how the target rule relates to the source rule, or source standard.

> *A quote within a Rule conformance note.*

Lorem ispum.

A rule is composed of all its parts: name, text, metasyntax, VALID examples, INVALID examples, and any explication. All these parts work together to create the meaning of the rule.

Rule name. *[Where applicable: [OVERRIDEN|DELETED] in Transforming rules, Section]*. The rule description is in plain English.

2.4.4.3 Transformation rule

(Overriding|Deleting|Extending) rule name. An (overriding|deleting|extending) rule description may be identical to the rule it (overrides|deletes|extends) for some part of its rule. *For the part of the rule description that is different this is styled as shown.*

2.4.5 Example palette

As far as possible examples will be drawn from the following:

```
2019-02-28T18:34:01+11:00 // Date-and-time, full. PM. Positive timezone offset.
1982-11-30T07:42:56-05:00 // Date-and-time, full. AM. Negative timezone offset.

-0379                     // BCE year (Plato's Republic).
 0125                     // CE Year (Epictetus' Enchiridion)

Y52000                    // Years exceeding 4 digits, positive.
Y-51234                   // Years exceeding 4 digits, negative.

1590~                     // Approximate year (Galilei's On Motion).
1256?                     // Uncertain year (Aquinas' Two sermons from MS Florence).
1273%                     // Approximate and uncertain year (Aquinas' Compendium of
theology).

1487/1490                 // Datetime interval (Da Vinci's Codex trivulzianus).
```

2.4.6 Requirements levels

Requirements levels metarule. The key words ...

- "MUST", "REQUIRED", "SHALL";
- "MUST NOT", "SHALL NOT";
- "SHOULD", "RECOMMENDED";
- "SHOULD NOT", "NOT RECOMMENDED"; and
- "MAY", "OPTIONAL".

... in this document are to be interpreted as described in (|RFC 2119: Requirements Levels|).

Note:

> 3. SHOULD This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
>
> 4. SHOULD NOT This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

In addition, there are the following definitions:

- **VALID ("VALIDITY", etc).** A format conforms with the standard. In effect a synonym for MAY.
- **ENCOURAGED ("ENCOURGE", etc).** Where there are two VALID formats this one should be chosen above the other unless there are overwhelming reasons to choose the other. In effect a synonym for "SHOULD" or "RECOMMENDED".
- **DISCOURAGED ("DISCOURAGE", etc).** Where there are two VALID formats this one should not be chosen above the other unless there are overwhelming reasons to do so. In effect a synonym for "SHOULD NOT" or "NOT RECOMMENDED".

2.4.7 Terms and definitions

Terms and definitions base metarule. The terms and definitions are as for (|ISO/DIS 8601-1:2016(e)|, 7–14, sec. 2 Terms and definitions) and (|ISO/DIS 8601-2:2016(e)|, 6–7, sec. 3 Terms and definitions).

Terms and definitions transformations metarule. We use the following OVERRIDES and EXTENSIONS:

Date-and-time. A compound of a date and time. In ISO 8601:20XX documents sometimes, and ambiguously, referenced as "date and time".

```
2019-02-28 18:34
2019-02-28 18:34+11:00
2019-02-28T18:34:01
```

Datetime. A generic term for any representation stipulated by this standard. Includes a date, a time, a date-and-time, season, an unspecified, a century, a qualified (approximate, uncertain, or both), an interval, etc.

Interval. A span between two datetimes (excluding another interval); or between one datetime and the open-or-unknown start/end points; or between two open-or-unknown start/end points.

Approximate-and-uncertain. A datetime that is both approximate and uncertain. In ISO 8601:20XX documents normally referenced as "approximate and uncertain".

Qualified datetime. A datetime that is: approximate; uncertain; or approximate-and-uncertain.

2.4.8 Datetime metasyntax

2.4.8.1 Introduction

(|ISO/DIS 8601-1:2016(e)|, 16, sec. “3.3 Representations and format representations”) speaks of:

- "Date and time ['datetime' in our language] representations", as with "2003-02-10"; and
- "Date and time ['datetime' in our language] format representations", as with "YYYY-MM-DD" ...

The synonym we use for "date and time format representations" is "datetime metasyntax".

Our datetime metasyntax is based on (Section “3.4 Characters used in the representations”, |ISO/DIS 8601-1:2016(e)|, 17–18) with some DISAMBIGUATIONS, DELETIONS, OVERRIDES and EXTENSIONS.

2.4.8.2 Characters used in place of digits or signs

```
Y     year
M     month
D     day

h     hour
m     minute
s     second

±     For positive values: an omitted and implied positive; or an explicit positive with
      a plus sign (+). Whether a plus sign is required or omissible or, if it may or may
      not be used, is ENCOURAGED to be omitted: is something determined by the rules.

      For negative values: A minus sign (-).

_     An underline preceding a digit represents that the digit is to be repeated zero or
      more times. The metasyntax format having the underline underneath the digit is
      DELETED (|ISO/DIS 8601-1:2016(e)|, 18, sec. 3.4 Characters used in the representations).
```

2.4.8.3 Characters used as designators

```
 Z    (literal capital Z)        UTC timezone designator.
"Y"   (literal capital "Y")      A prefix for years outside of the -9999 to 9999 range.
                                 The quotes are not output.
```

2.4.8.4 Characters used as separators

```
-     (hyphen)      to separate the date components “year” and “month”, and “month” and
                    “day”; or "year" and other date components (e.g. "season",
                    "quarter").
" "   (space)       in a date-and-time: separates the date and time; and time and
                    timezone designator (BDF only).
T     (literal capital "T")      in a date-and-time: separates the date and time.
~     (tilde)       a separator, the character for which is specified at a different
                    rule. Includes no-separator.
```

```
:     (colon)       to separate the time elements “hour” and “minute”, and “minute” and
                    “second”;
/     (forward slash)     to separate datetimes in intervals.
```

2.4.8.5 Ad hoc Backus-Naur form (BNF) characters

```
[ ]   (brackets)    if required. E.g. ["Y"] and [_YY] ...

                    Not all "if required" components are represented by the brackets, [
                    ], metasyntax. See individual rule text, and rule examples, to
                    determine what's optional, in particular the reduced precision rule.
                    Otherwise we could end up with a monstrosity like ...

                    ["Y"][±][_YY][YY[YY[-MM[-DD]]]][~[hh:[mm[:ss]]][~(Z|±hh[:mm])]]


(A|B) (with pipe)   alternatives. E.g. (" "|T) and (Z|±hh:mm). Parentheses not output.
{ }   (curly braces)DISCOURAGED format (encouraged formats are not delimited). Curly
                    braces should not be output.
//    (two forward slashes)       Starts a comment.
...   (three dots)  prefixes and/or suffixes a format that is a part of a larger format.
```

2.4.8.6 Examples

```
["Y"][±][_YY]YYYY-MM-DD~hh:mm:ss~(Z|±hh:mm)     // Date-and-time rule.

YYYY/YYYY                                 // An interval between two years.

// Negative date-and-time. Not addressing extended years nor timezone designators for
this rule.
...-...YYYY-MM-DD~hh:mm:ss...
```

3 Rules

3.1 The Bibliographic ISO 8601 Profile (BP)

3.1.1 Introduction

From Relationship to other standards:

> The Bibliographic ISO 8601 Profile is an ISO 8601 profile of another ISO 8601 profile: (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|).
>
> (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|), because it is also an ISO 8601 profile, stands in relation to the larger standard(s) which contain it: (|ISO/DIS 8601-1:2016(e)|) and (|ISO/DIS 8601-2:2016(e)|).
>
> Because the Bibliographic ISO 8601 Profile stands in relation to (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) it also stands (indirectly) in relation to (|ISO/DIS 8601-1:2016(e)|) and (|ISO/DIS 8601-2:2016(e)|). So sometimes the Bibliographic ISO 8601 Profile rules have a conformance type with regard to those later two standards...
>
> The Bibliographic ISO 8601 profile ... aims to provide the closest possible interpretation of the intentions of the authors of (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|), consistent with providing a

coherent standard. The Bibliographic ISO 8601 profile, in that sense, attempts to track (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|).

3.1.2 Separators

Date-and-time separator rule. *[OVERRIDDEN in the Transformation, Separators].* A date-and-time is separated by a capital "T". A space separator MUST NOT be used.

```
...YYYY-MM-DDThh:mm:ss...
```

```
2019-02-28T18:34:01        // Date-and-time, "T" separated.
2019-02-28T18:34           // Date-and-time, minute precision.

Invalid:
2019-02-28 18:34:01        // Date-and-time, space separated.
```

DISABMBIGUATES (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) at level 0.

(|ISO/DIS 8601-1:2016(e)|, 26, sec. 4.3.2 [Date and time of day] Complete representations) stipulates ...

> *The character [T] shall be used as time designator to indicate the start of the representation of the time of day component in these expressions ... [but] By mutual agreement of the partners in information interchange, the character [T] may be omitted in applications where there is no risk of confusing a date and time of day representation*

... the implication being that a "T" may be omitted in and substituted by a space (if the "T" is simply removed the date would run into the time for an unreadable and confusing 2019-02-2818:34:01). That is, for (|ISO/DIS 8601:2016(e)|) overall it appears that "T" and space date-and-time separators MAY both be used, but "T" is ENCOURAGED.

By contrast ("C.4.2 Date and Time", |EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29) stipulates ...

> *A date/time string is composed according to one of three representations as illustrated in the following three examples:*
> - *2001-02-03T09:30:01*
> - *2004-01-01T10:10:10Z*
> - *2004-01-01T10:10:10+05:00*

This stipulation by enumeration shows only the 'T' separator. That is, for the EDTF 8601 Profile it appears that "T" MUST be used as the date-and-time separator; and a space separator MUST NOT be used ... although there's no textual description to back this up. Where a EDTF 8601 Profile rule OVERRIDES a ISO/DIS 8601:2016 rule, a Bibliographic ISO 8601 profile rule must go with the EDTF 8601 Profile rule.

{It is possible to take the view that the stipulation by enumeration in (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) didn't mean to exclude space separators between the date and time. On this view the (BP) "Date-and-time separator rule" could be changed to permit space separators. However, I've taken the current approach to exemplify how a BP rule can be OVERRIDEN in The Transformation.}

Timezone designator separator rule. *[OVERRIDEN in the Transformation, Separators].* Between the date-and-time and a timezone designator: there is no separator.

```
...hh:mm:ss(Z|±hh:mm)
```

```
2019-02-28T18:34:01Z      // Date-and-time, with timezone - Zulu = Universal Time Co-
ordinated.
2019-02-28T18:34:01+11:00 // Date-and-time, with timezone offset - long form.
2019-02-28T18:34:01+11    // Date-and-time, with timezone offset - short form.
1982-11-30T07:42:56-05:00 // Date-and-time, with timezone offset - long form, negative.

Invalid:
2019-02-28T18:34:01 Z            // Timezone separator, space separated.
2019-02-28T18:34:01 +11:00       // Timezone separator, space separated.
2019-02-28T18:34:01 11:00        // Timezone separator, space separated. Missing sign.
```

DISAMBIGUATES (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) at level 0.

(|ISO/DIS 8601-1:2016(e)|, 25, sec. 4.2.5.1 Difference between local time and UTC of day) makes in clear that when using an offset a plus (+) or minus (-) sign MUST be used ....

> *It shall be expressed as positive (i.e. with the leading plus sign [+]) if the local time is ahead of or equal to UTC of day and as negative (i.e. with the leading minus sign [-]) if it is behind UTC of day.*

... and there is no space seperation between between the time and timezone designator ...

> *When it is required to indicate local time and the difference between the time scale of local time and UTC, the representation of the difference shall be appended to the representation of the local time following immediately, without space. (|ISO/DIS 8601-1:2016(e)|, 25, sec. 4.2.5.2 Local time and the difference from UTC)*

(|ISO/DIS 8601-1:2016(e)|, 38, Annex A (normative) Extended Backus–Naur Form (EBNF)) makes it clear that there is no seperatar between a Zulu or Offset timezone designator:

```
(* 4.2.4 UTC of day *)

UTCofDayHrMinSecExt = hour, ":", minute, ":", second, "Z" ;
...
UTCofDayHrMinExt = hour, ":", minute, "Z" ;

(* 4.2.5.1 Difference between local time and UTC of day *)
...
UTCoffsetExt = ("+" | "-"), (hour, ":", minute | hour) ;

(* 4.2.5.2 Local time and the difference from UTC *)
...
localPlusUTCext = hour, ":", minute, ":", second, UTCoffsetExt ;
```

At (|ISO/DIS 8601-1:2016(e)|, 25, sec. 4.2.5.2 Local time and the difference from UTC"), however, there are examples without any sign and with a space seperator (e.g. "15:27:46 05:00"). But, that example is supposed to represent "New York (in winter five hours behind UTC)". Clearly, then, the authors intended to include a minus sign (as in "15:27:46-05:00") and hold that a space seperator between the time and timezone designator MUST NOT be used. But that small error means we are "DISAMIGUATING" the rule rather than providing a "CONFORMS with".

In addition (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) stipulates ...

> *A date/time string is composed according to one of three representations as illustrated in the following three examples:*

> - *2001-02-03T09:30:01*
> - *2004-01-01T10:10:10Z*
> - *2004-01-01T10:10:10+05:00*

This stipulation by enumeration doesn't show any timezone designator with a leading space separator.

Extended format (with hyphen and colon separators) only rule. Extended format MUST be used. That is, all date components are hyphens "-" separated, all time components are colon ":" separated, and all timezone offset designator components are colon ":" separated. Basic format, without those separators, MUST NOT be used.

```
2019-02-28T18:34:01+11:00 // Extended format
2019-02-28T18:34          // Extended format
2019-02                   // Extended format

Invalid:
20190228T183401+1100      // Basic format
20190228T1834             // Basic format
201902                    // Basic format
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 28, sec. C.3 Extended format) at Level 0:

> *All features in this profile use extended format: hyphens separating date components and colons separating time components. Basic format is not used.*

3.1.3 Reduced precision

Reduced precision rule. With some constraints and exceptions, a reduced precision is achieved by omitting datetime components starting from the right. The constraints and exceptions are:

- Hour and minute precision in a time is VALID (Time, *Time rule*).
- Hour precision in a timezone designator is VALID (Date-and-time, *Timezone designator rule*).
- The time part of a date-and-time MAY have reduced precision, to minute or hour precision, even if there is a timezone designator (Date-and-time, *Timezone designator rule*).
- A time MUST NOT be used without a date (Time, *No time only rule*).
- The date part of a date-and-time MUST NOT have reduced precision (Date-and-time, *Date-and-time rule*).

```
2019-02-28T18:34:01+11:00 // With timezone.
2019-02-28T18:34:01+11    // With timezone, offset hour precision.
2019-02-28T18:34+11:00    // With timezone, offset minute precision. Time minute
precision.
2019-02-28T18+11:00       // With timezone, offset minute precision. Time hour
precision.

2019-02-28T18:34:01       // Without timezone. Time second precision.
2019-02-28T18:34          // Without timezone. Time minute precision.
2019-02-28T18             // Without timezone. Time hour precision.

2019-02-28                // Day precision.
2019-02                   // Month precision.
2019                      // Year precision.
```

```
Invalid:
18:34:01                // A time without a date.
2019-02T18:34:01        // Reduced date precision in a date-and-time.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 28, sec. C.4.1 Date) at level 0.

(|ISO/DIS 8601-1:2016(e)|, 20, sec. 4.1.2.3 [Date] Representations with reduced precision):

> *If in a given application it is sufficient to express a calendar date with less precision than a complete representation as specified in 4.1.2.2, either two, four or six digits may be omitted, the omission starting from the extreme right-hand side.*

(|ISO/DIS 8601-1:2016(e)|, 23, sec. 4.2.2.3 [Time of day] Representations with reduced precision)

> *If the degree of precision required permits, either two or four digits may be omitted*

(|ISO/DIS 8601-1:2016(e)|, 26–27, sec. 4.3.3 [Date and time of day] Representations other than complete)

> *c) [In a Date and time of day] the date component shall not be represented with reduced precision;*

3.1.4 Date

Date rule. Full dates will be ordinarily expressed as a year with four digits, month with two digits, and day with two digits, in that order. That is, the datetime components increase in precision from left to right. Reduced precision dates can be represented by dropping the more precise datetime components from the right.

```
...YYYY-MM-DD
```

```
2019-02-28          // A day.
2019-02             // A month.
2019                // A year.
```

```
Invalid:
20190228            // "Basic format", with hyphens omitted.
28th Feb 2019       // Customary region specific.
28-02-2019          // Customary region specific ordering.
19-02-28            // Two-digit years.
2019/02/28          // Non-hyphen separator.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 28–29, sec. C.4.1 Date) at Level 0.

Plus or minus year symbol rule. Negative years MUST be prefixed by the minus sign (-). Positive years SHOULD NOT be prefixed by the plus sign (+), but MAY be.

```
  ...YYYY-MM-DD...  // Positive ENCOURAGED.
...{+YYYY-MM-DD}... // Positive DISCOURAGED.

 ...-YYYY-MM-DD...  // Negative.
```

```
  2019              // Positive year, no plus sign. ENCOURAGED.
  0125              // Positive year, not long after the year zero, no plus sign.
ENCOURAGED.
{+2019}             // Positive year, plus sign. DISCOURAGED.
```

```
{+0125}           // Positive year, plus sign. DISCOURAGED.

 -0379            // Negative year, minus sign, REQUIRED.
```

DISAMBIGUATES (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 28–29, sec C.4.1 Date) at level 0.

This section allows that "A year may be positive, negative, or year zero".

On the minus sign (-) it's clear that it is REQUIRED if a negative year needs representing. From (|ISO/DIS 8601-1:2016(e)|, 17–18, sec. 3.4.2 Characters used in place of digits or signs) ...

> *[±] represents a plus sign [+] if ..., or a minus sign [-] if in combination with the following element a negative value needs to be represented.*

On the plus (+) sign. From (|ISO/DIS 8601-1:2016(e)|, 17–18, sec. 3.4.2 Characters used in place of digits or signs) ...

> *[±] represents a plus sign [+] if in combination with the following element a positive value or zero needs to be represented (in this case, unless explicitly stated otherwise, the plus sign shall not be omitted), or a minus sign [-] if in combination with the following element a negative value needs to be represented.*

... That seems to suggest that the plus sign is ENCOURAGED and it's ommission is DISCOURAGED. However, throughout (|ISO/DIS 8601:2016(e)|) most datetime metasyntax ("date and time format representations" in ISO speak) omits a [±], and that is backed-up by concomitant examples. For example, (|ISO/DIS 8601-1:2016(e)|, 20, sec. 4.1.2.2 Complete representations) has ...

> *Extended format: YYYY-MM-DD Example: 1985-04-12*

Otherwise the only places where a [±] symbol is shown in the datetime metasyntax are:

... For expanded representations (years exceeding four digits, with mutual agreement, in other words) see (|ISO/DIS 8601-1:2016(e)|, 20, sec. 4.1.2.4 Expanded representations) ...

> *Extended format: ±YYYYY-MM-DD Example: +001985-04-12*

... For timezone designator offsets ...

> *It shall be expressed as positive (i.e. with the leading plus sign [+]) if the local time is ahead of or equal to UTC of day and as negative (i.e. with the leading minus sign [-]) if it is behind UTC of day. ...*
>
> *Extended format: ±hh:mm Example: +01:00*

In (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 12–13, sec. Year exceeding four digits), for the format not requiring mutual agreement, there is no [±] symbol supplied in the metasyntax. We have ...

> *Format:*
> - *"Y"YYYYY...*
> - *"Y-"YYYYY...*
>
> *Examples:*

> - *Y170000002 (the year 170000002)*
> - *Y-170000002 (the year -170000002)*

... with the plus sign omitted.

That is, for ISO the implied rule for positives seems to be: if there is no [±] shown in the metasyntax then plus sign ommission is ENCOURAGED, but a plus sign MAY be used; and if there is a [±] shown in the metasyntax then plus sign inclusion MUST be used.

To make this less confusing, to DISAMBIGUTATE plus sign issues, BDF has separate rules: Plus or minus year symbol rule; and a Timezone designator rule (within which a clause stipulates what to do with timezone designator offset plus or minus symbol). Then, for years (whether a 4 digit year or year exeeding four digits) having a plus sign (+) is DISCOURAGED, although including it is VALID.

Zero year rule. The year zero is written as `0000` (ENCOURAGED) or `{+0000}` (DISCOURAGED).

```
  0000            // Year zero, ENCOURAGED.
{+0000}           // Year zero, DISCOURAGED.
```

DISAMBIGUATES (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 28–29, sec C.4.1 Date) at Level 0.

From (|ISO/DIS 8601-1:2016(e)|, 17–18, sec. 3.4.2 Characters used in place of digits or signs)

> *[±] represents a plus sign [+] if in combination with the following element a positive value or zero needs to be represented (in this case, unless explicitly stated otherwise, the plus sign shall not be omitted), or a minus sign [-] if in combination with the following element a negative value needs to be represented.*

Therefore, for ISO a year zero SHOULD BE treated in the same way as positive years.

We therefore follow the pattern established for "Plus or minus year symbol rule".

Astronomical calendar rule. The astronomical calendar is used. That is, there is a year zero. Consequently, to convert a negative Bibliographic Datetime Format (BDF) into a traditional BCE (or BC) format: decrement the BDF date by 1 before taking the absolute of the number and appending "BCE" (or "BC"). In other words, around the year zero we have the following mappings.

BDF	Traditional
0002	2 CE
0001	1 CE
0000	1 BCE
-0001	2 BCE
-0002	3 BCE

```
0125              // 125 CE. Not long after the year zero.
0001              //   1 CE.
```

```
 0000             // The year zero, or 1 BCE.
-0001             //   2 BCE.
-0379             // 380 BCE.

Invalid:
  125             // Three digit year.
 0125 CE          // Suffixes forbidden.
// "-0380" where the author intends "380 BCE".
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 28–29, sec. C.4.1 Date) at Level 0.

> *This specification assumes astronomical numbering, which includes the year zero.*

Years exceeding four digits rule. *[OVERRIDEN in the Transformation, Date]*. Years after `9999` or before `-9999` MUST be represented by: the common format; plus one of two alternatives (neither is ENCOURAGED nor DISCOURAGED):

The common format: if positive, MAY have a plus sign (+) (DISCOURAGED); if negative, MUST have minus sign; more than 4 digits to represent the year; no digit separator (such as a comma); MAY be used for either a date or date-and-time.

The alternative formats:

1. With mutual consent (between parties in the exchange): MUST NOT have a capital "Y" prefix;

```
  [_YY]YYYY-MM-DD...         // Positive. ENCOURAGED.
{+[_YY]YYYY-MM-DD}...        // Positive. DISCOURAGED.

 -[_YY]YYYY-MM-DD...         // Negative.

  52000       // Positive year 52,000, no plus sign. ENCOURAGED.
{+52000}      // Positive year 52,000, plus sign. DISCOURAGED.

 -51234       // Negative 51,235 BCE, minus sign. REQUIRED.

  52000-02-28 // Day precision.
  52000-02    // Month precision.

  52000-02-28T18:34:01+11:00     // Years exceeding four digits with date-and-time.
```

```
Invalid:
 Y52000       // Has "Y" prefix.
Y+52000       // Has "Y" prefix.
Y-51234       // Has "Y" prefix.
 52,000       // Digit separator.
```

DISAMBIGUATES with the with-mutual-consent format (|ISO/DIS 8601-2:2016(e)|, 12–13, sec. 4.5 Year exceeding four digits) at level 1.

> *Part 1 of this standard allows a year to exceed four digits (a year after 9999 or before -9999) however it requires mutual agreement of the partners in the information exchange...*

Looking therefore at (|ISO/DIS 8601-1:2016(e)|, 20–21 sec. 4.1.2.4. Expanded respresentations) we find

> *Extended format: ±YYYYY-MM-DD Example: +001985-04-12*

That shows: years exceeding 4 digits; without a capital "Y" prefix; no digit separator (such as a comma); a month; a day.

It also shows a plus (+) symbol: we take the view this is MERELY demonstrating a VALID format rather than an ENCOURAGED format, given the "Plus or minus year symbol rule" above.

2. Without mutual consent (between parties in the exchange): MUST have a capital "Y" prefix;

```
    ["Y"_YY]YYYY-MM-DD...    // Positive. ENCOURAGED.
{["Y"]+[_YY]YYYY-MM-DD}...   // Positive. DISCOURAGED.

 ["Y"]-[_YY]YYYY-MM-DD...    // Negative.
```

```
  Y52000      // Positive year 52,000, no plus sign. ENCOURAGED
{Y+52000}     // Positive year 52,000, plus sign. DISCOURAGED.

 Y-51234      // Negative year 51,235 BCE, minus sign. REQUIRED

  Y52000-02-28               // Day precision.
  Y52000-02                  // Month precision.

  Y52000-02-28T18:34:01+11:00// Years exceeding four digits with date-and-time.
```

```
Invalid:
 52000        // Missing "Y" prefix.
+52000        // Missing "Y" prefix.
-51234        // Missing "Y" prefix.
Y52,000       // Digit separator.
```

DISAMBIGUATES the without-mutual-consent format (|ISO/DIS 8601-2:2016(e)|, 12–13, sec. 4.5 Year exceeding four digits) at level 1.

> *Presented here is an alternative method, which does not require mutual consent. ...*
>
> *Format:*
> *“Y”YYYYY…..*
> *“Y-”YYYYY…..*
>
> *Examples:*
> *Y170000002 (the year 170000002)*
> *Y-170000002 (the year -170000002)*

The following seems to indicate that month or day level precision MUST NOT be used with this format.

> *It may be used only for dates where only the year is significant, not the month or day.*

However, we take the view this is in error given that month and day level precision is exemplified with regard to the other format (requring-mutual-consent with a capital "Y"). That is, we take the view that month and day level precision is VALID for both formats and the ISO authors did not intend to to forbid it.

Overall DISAMBIGUATES (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 ISO 8601 Part 2, with the exception of recurring time intervals".

For either format either a date or date-and-time MAY be used as (|ISO/DIS 8601-1:2016(e)|, 26, sec. 4.3 Date and time of day > 4.3.3 Representations other than complete) ...

> *For reduced precision, decimal or expanded representations [that is, years exceeding four digits] of date and time of day, any of the representations in 4.1.2 (calendar dates), ... followed immediately by the time designator [T] may be combined with any of the representations in 4.2.2.2 through 4.2.2.4 (local time), 4.2.4 (UTC of day) or 4.2.5.2 (local time and the difference from UTC) provided that Time ...*

3.1.5 Time

No time only rule. A time MUST NOT be used without a date.

```
Invalid:
18:34:01          // Time without a date.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 28, sec. C.4 Level 0) at Level 0.

There's no provision for a time without a date:

> *must support date (year only, year and month, and year, month and day), date and time, time interval, and century, ...*

Time rule. Times are in 24-hour format. Hours, minutes, and seconds are expressed as two digits, having a leading zero if the component is less than 10. These are colon (:) separated. Minute and hour level precision MAY be used. Suffixes "am" or "pm" MUST NOT be used.

```
...hh:mm:ss...
```

```
2019-02-28T18:34:01       // Hours, minutes, seconds. Second precision.
2019-02-28T18:34          // Hours, minutes. Minute precision.
2019-02-28T18             // Hour precision.
2019-02-28T07:42          // Hours, minutes. Leading zero for hour.
```

```
Invalid:
2019-02-28T183401         // "Basic format", without colon (:) separators.
2019-02-28T7:42           // Omits leading zero in hour.
2019-02-28T07:42 am       // am/pm.
```

DISAMBIGUATES (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) at level 0.

The stipulation by enumeration there doesn't show a minute or hour level precision. However we take the view that this stipulation by enumeration didn't mean to contradict other parts of the spec. That is, that minute and hour level precision MAY be used, as reflected at (|ISO/DIS 8601-1:2016(e)|, 23, sec. 4.2.2.3 [Time of day] Representations with reduced precision).

> *If the degree of precision required permits, either two or four digits may be omitted from the representation ...*
>
> *a) A specific hour and minute*
> *...*
> *Extended format: hh:mm Example: 23:20*
> *...*

> *b) A specific hour*
> *Basic format: hh Example: 23*
> *Extended format: not applicable*

We take the view that "Extended format: not applicable" just means an hour level precision is permitted even if you are generally following an extended format, as we are, given that the basic format example shows an hour "23". That is, that the "not applicable" here means that there are no time component separtors with hour level precision.

{It is possible to take the view that the stipulation by enumeration in (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|) doesn't permit minute nor hour precision. In that case, assuming we want minute and hour precision, we'd have to change the Time rule and override it in the Transformation. However, I've taken the current approach to exemplify how a DISAMBIGUATING rule would make unnecessary an OVERRIDING rule in the Transformation.}

Time component decimal fraction rule. The hour, minute, and second MUST NOT be represented with decimal fractions.

```
Invalid:
18:34:01,886       // Seconds fraction. Comma separated.
18:34:01.886       // Seconds fraction. Full stop separated.
18:34,886          // Minutes fraction. Comma separated.
18,886             // Hours fraction. Comma separated.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) at level 0.

(|ISO/DIS 8601-1:2016(e)|, 23, sec. 4.2.2.4 [Time of day] Representations with decimal fraction) allows for decimal fractions in a time. There's no analogous section, anywhere in ISO 8601:2016, allowing decimal fractions in a date. So it seems ISO 8601:2016 forbids decimals in dates but allows it in times.

However, under (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) neither the stipulation by enumeration shows, nor does the text describe, decimal fractions in a time.

3.1.6 Date-and-time

Date-and-time rule. A date-and-time is formatted by combining the rules under the above sections Date and Time excepting the date part MUST NOT have reduced precision.

```
["Y"]±[_YY]YYYY-MM-DD~hh:mm:ss~(Z|±hh:mm)

        ...YYYY-MM-DD~hh:mm:ss...        // Positive ENCOURAGED.
   {...+...YYYY-MM-DD~hh:mm:ss...}       // Positive DISCOURAGED.

    ...-...YYYY-MM-DD~hh:mm:ss...        // Negative.
```

```
  2019-02-28T18:34:01     // Date-and-time, "T" separated. Positive ENCOURAGED.
  2019-02-28T18:34        // Date-and-time, minute precision. Positive ENCOURAGED.

{+2019-02-28T18:34:01}    // Date-and-time, "T" separated. Positive DISCOURAGED.
{+2019-02-28T18:34}       // Date-and-time, minute precision. Positive DISCOURAGED.

 -0379-02-28T18:34:01     // Date-and-time, negative years (380 BCE) with second
precision.
```

```
Invalid:
20190228T183401          // Basic format
2019-02T18:34:01         // Reduced date precision in a date-and-time.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) at level 0.

(|ISO/DIS 8601-1:2016(e)|, 27, sec. 4.3.3 [Date and time of day] Representations other than complete)

> *c) [In a Date and time of day] the date component shall not be represented with reduced precision;*

Timezone designator rule. A timezone designator MAY be appended to a date-and-time[1].

When appended to a date-and-time a timezone designator represents either[2]:

- Zulu time. That is, Universal Time Co-ordinated (UTC). Represented with a capital "Z"; or
- A timezone offset from Zulu time. Represented with hours and minutes (long form); or hours only (short form)[3]. A timezone offset MUST start with a plus (+) or minus (–) symbol (the plus sign MUST NOT be omitted)[4].

The time part of a date-and-time may have reduced precision, to minute or hour precision, even if there is a timezone designator[5].

```
["Y"][±][_YY]YYYY-MM-DD~hh:mm:ss~(Z|±hh:mm)
```

```
2019-02-28T18:34:01Z      // Date-and-time, with timezone - Zulu = Universal Time Co-
ordinated.

2019-02-28T18:34:01+11:00 // Date-and-time, with timezone offset - long form.
2019-02-28T18:34:01+11    // Date-and-time, with timezone offset - short form.
1982-11-30T07:42:56-05:00 // Date-and-time, with timezone offset - long form, negative.

2019-02-28T18:34+11:00    // Date-and-time, with timezone offset. Time minute precision.
```

```
Invalid:
2019-02-28T18:34:01 11:00 // Missing timezone sign.
```

1. *DISAMBIGUATES (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec C.4.2 Date and Time). "Zone-offset may be omitted or included". Given this statement comes immediately after the examples show both a Zulu Time ("Z") and a timezone offset ("+05:00") we take the view that by "Zone-offset" the authors intended the general "timezone designator".*
2. *CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time)*

   > *Time zone designation consists of either a 'Z' to indicate UTC, or a '+' or '-' to indicate "ahead of UTC" or "behind UTC", followed by a 2-digit hour, followed optionally by a colon and the 2-digit minutes.*

3. *CONFORMS with, as above.*
4. *DISAMBIGUATES (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) and (|ISO/DIS 8601-1:2016(e)|, 25, sec. 4.2.5.1 Difference between local time and UTC of day).*

   In (|ISO/DIS 8601-1:2016(e)|, 25, sec. 4.2.5.1 Difference between local time and UTC of day) the text makes in clear that when using an offset a plus (+) or minus (-) sign is REQUIRED.

> *It shall be expressed as positive (i.e. with the leading plus sign [+]) if the local time is ahead of or equal to UTC of day and as negative (i.e. with the leading minus sign [-]) if it is behind UTC of day.*

The Extended Backus–Naur Form (EBNF) also makes it clear that a plus (+) or minus (-) sign is REQUIRED for timezone offsets (|ISO/DIS 8601-1:2016(e)|, 38, sec. Annex A (normative) Extended Backus–Naur Form (EBNF)):

```
(* 4.2.5.1 Difference between local time and UTC of day *)
...
UTCoffsetExt = ("+" | "-"), (hour, ":", minute | hour) ;

(* 4.2.5.2 Local time and the difference from UTC *)
...
localPlusUTCext = hour, ":", minute, ":", second, UTCoffsetExt ;
```

At (|ISO/DIS 8601-1:2016(e)|, 25, sec. 4.2.5.2 Local time and the difference from UTC"), however, there are examples without any sign and with a space seperator (e.g. "15:27:46 05:00"). But, that example is supposed to represent "New York (in winter five hours behind UTC)". Clearly, then, the authors intended to include a minus sign (as in "15:27:46-05:00"). But that small error means we are "DISAMIGUATING" the rule rather than providing a "CONFORMS with".

(|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.2 Date and Time) doesn't present any reason to overide what we find in ISO/DIS 8601 in general.

5. *From (|ISO/DIS 8601-1:2016(e)|, 25, sec. 4.2.5.2 Local time and the difference from UTC)*

> *Extended format:*
>
> *Example:*
> *15:27:46+01:00*
> *...*
> *15:27:46+01*
> *...*
>
> *In these expressions the local time component may be represented with reduced precision as defined in 4.2.2.3 [showing the reduced precision extended format example "23:20" and the "specific hour" as "23"]*

Beginning of day rule. The beginning of the day is marked by six, four, or two zeros in the time part of a date-and-time. The expression `...24:00...` MUST NOT be used and therefore there is no "end of the day" date-and-time. The term "midnight" must not be used.

```
...YYYY-MM-DD~00:00:00...
```

```
2019-02-28T00:00:00       // The beginning of 28th Feb 2019. Second precision.
2019-02-28T00:00          // The beginning of 28th Feb 2019. Minute precision.
2019-02-28T00             // The beginning of 28th Feb 2019. Hour precision.

2019-02-28T00:00+11:00    // The beginning of 28th Feb 2019, at a specific timezone
```

```
Invalid:
2019-02-28T24:00:00       // The 24th hour.
2019-02-28T24:00          // The 24th hour.
00:00:00                  // A time only.
```

CONFORMS with (|ISO/DIS 8601-1:2016(e)|, 23, sec. 4.2.1 [Time of day] General)

> *NOTE 2 The expression “00:00:00” denotes beginning of day; for Information Technology Interchange there is no representation of end of day. Thus even though it is recognized that the expression “24:00:00” is used as a natural language expression to denote end of a day, this expression is not used for Information Technology Interchange*

CONFORMS with (|ISO/DIS 8601-1:2016(e)|, 5, sec. Foreword)

> *[ISO/DIS 8601:2016 eliminates] the term "midnight" and [makes] changes to the use of the value '24' for hour. This is in response to requests from the Information Technology user communities to (1) remove ambiguities caused by the term "midnight", which has been replaced by "Beginning of day" and "End of day"; and (2) align the representation of the beginning/end of day with current de facto industry practice;*

CONFORMS with (|ISO/DIS 8601-1:2016(e)|, 24, sec. 4.2.3 Beginning of the day)

> *Extended format ... 00:00:00 ... The representations may have reduced precision in accordance with 4.2.2.3 [i.e. 00:00, minute precision, for the extended format; or 00 for hour precision.]*

Absent timezone designator rule. Without a timezone designator the date-and-time is understood to be a local datetime. That is, a local datetime having either: a timezone that is obvious from the context; or an indeterminate timezone.

```
2019-02-28T18:34          // A local datetime, having either: an obvious timezone; or an
                             indeterminate timezone.
```

DISAMBIGUATES (|ISO/DIS 8601-1:2016(e)|, 10, sec. 2.1.16 local time).

There's no description in ISO 8601:2016 of "obvious timezone" or "indeterminate timezone". That counts as an interpretive addition about what a "local time" (without a timezone designator) could possibly mean.

What we have in (|ISO/DIS 8601-1:2016(e)|, 10, sec. 2.1.16 local time) is:

> ***local time**: locally applicable time of day such as standard time of day, or a non-UTC based time of day.*

3.1.7 Season

Season rule. Seasons are designated as follows: spring (`21`), summer (`22`), autumn (`23`), and winter (`24`). A season designator must be appended to a year.

```
...YYYY-(21|22|23|24)
```

```
2019-21           // Spring of 2019.
2019-22           // Summer of 2019.
2019-23           // Autumn of 2019.
2019-24           // Winter of 2019.

Invalid:
21                // A season designator on its own.
```

If seasons where permitted without a year then there would be no way to differentiate the season from a century. E.g. it would be unclear if `21` referenced a spring in general or the twenty second century.

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 14, sec. 4.7 Divisions of a year > 4.7.1 Level 1).

3.1.8 Unspecified

Unspecified rule. An `X` specifies the digit of a date component that is unspecified. `X` can only be used contiguously from the right-most character. Only the following types are permitted:

Type	Interpretation	Format	Valid Example
Year and month specified, day unspecified	Some day in a month	YYYY-MM-XX	2019-02-XX
Year specified, day and month unspecified	Some day in a year	YYYY-XX-XX	2019-XX-XX
Entire date unspecified	Some day	XXXX-XX-XX	XXXX-XX-XX
A year-month, with month unspecified	Some month in a year	YYYY-XX	2019-XX
A year-month, with year and month unspecified	Some month	XXXX-XX	XXXX-XX
A year, with one rightmost digit unspecified	Some year in a decade	YYYX	198X
A year, with two rightmost digits unspecified	Some year in a century	YYXX	20XX
A year, entire year unspecified	Some year	XXXX	XXXX

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 10–11, sec. 4.3 Unspecified > 4.3.1 Level 1)

3.1.9 Century

Century rule. *[DELETED in the Transformation, Century]*. Centuries MAY be represented by two digits.

```
19                  // The twentieth century.
```

A century can, instead, be represented by a datetime interval (e.g. `1900/1999` instead of `19`).

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.4.4 Century) at level 0.

3.1.10 Qualified date

Qualification (approximate, uncertain, and approximate-and-uncertain) applicability rule. *[OVERRIDEN in the Transformation, Qualified datetime].* The qualifications approximate, uncertain, and approximate-and-uncertain, only apply to dates. This includes dates with reduced precision. Qualifications MUST NOT be used on date-and-times. Qualifications only occur at the end of the string and apply to the whole date.

```
1590-02-28~         // Qualification of day.
1590-02?            // Qualification of month.
1590%               // Qualification of year.
```

```
Invalid:
2019-02-28T18:34:01~            // Qualification (approximate) of a date-and-time.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 7, sec. 4.2 Uncertain and/or approximate date) ...

> *"Uncertain" and/or "approximate" may apply to full representations as well as representation with reduced precision.*

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 7, sec. 4 Date and Time Extensions > 4.1 General > 4.2.1 Level 1) ...

> *For level 1, '?,' '~', or '%' may only occur at the end of the date string, and it applies to the entire date.*

Approximate rule. An approximate, or circa, datetime has a tilde (~) appended.

```
2019-02-28~       // Approximate. Day precision.
1590~             // Approximate. Often output with the circa abbreviation, as in "ca.
1590".
```

From (|ISO/DIS 8601-2:2016(e)|, 6–7, sec. 3 Terms and definitions):

> 3.2 **approximate**. date which is an estimate whose value is asserted to be possibly correct, and if not, close to correct. Note 1 to entry: Where 'close to correct' means "close enough, for the application".

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 7, sec 4.2 Uncertain and/or approximate date)

Uncertain rule. An uncertain datetime has a question mark (?) appended.

```
2019-02?          // Uncertain. Month precision.
1256?             // Uncertain.
```

From (|ISO/DIS 8601-2:2016(e)|, 6–7, sec. 3 Terms and definitions):

> 3.1 **uncertain**. date whose source is considered dubious.

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 7, sec 4.2 Uncertain and/or approximate date)

Approximate-and-uncertain rule. A datetime that is both approximate and uncertain, an "approximate-and-uncertain" datetime, has a percentage (%) appended.

```
2019-02%          // Approximate-and-uncertain. Month precision.
1273%             // Approximate-and-uncertain.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 7, sec 4.2 Uncertain and/or approximate date)

3.1.11 Interval

Interval rule. *[OVERRIDEN in the Transformation, Interval].* A date of day, month or year precision, MAY start or end an interval[1] ...

- The interval is forward slash (/) separated.
- The end date MUST be later than or equal to the start date[2].
- Years exceeding four digits MAY be used[3].
- Qualifiers (approximate, uncertain, and approximate-and-uncertain) MAY be used[4].
- Start and end dates MUST NOT be a: date-and-time; or season[1].
- Interval shorthands MUST NOT be used[5].

```
["Y"]±[_YY]YYYY-MM-DD/["Y"]±[_YY]YYYY-MM-DD
```

```
1982-11-30/2019-02-28     // Between dates with day precision.
1982-11/2019-02           // Between dates with month precision.
1487/1490                 // Between two years.
1982-11-30/2019           // Between two dates, with asymmetric precision.
Y-51234-11-30/Y52000      // Between two dates with years exceeding four digits.

1982-11-30~/2019-02-28?   // Qualified dates at either end.
1982-11-30/2019%          // Qualified date at one end.
```

```
Invalid:
1982-11-30T07:42/2019-02-28T18:34 // Between date-and-times.
1982-21/2019-22                   // Between seasons.
1490/1487                         // Start year later than end year.

1982-11-30/12-16                  // Interval shorthand. From 1982-11-30 to 1982-12-16

// Interval shorthand. From 1982-11-30T07:42:56+11:00 to 1982-12-16T18:34:01+11:00
1982-11-30T07:42:56+11:00/1982-12-16T18:34:01
```

DISAMBIGUATES with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.3 Time interval).

1. *Seasons and date-and-times MUST NOT be used in intervals ...*

   > *Either endpoint may be a year, year-month, or year-month-day*

2. *(|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.3 Time interval):*

   > *The end endpoint must be later than or equal to the start endpoint*

3. *Years exceeding four digits MAY be used even though these are not explicitly mentioned in that section. That is, by relying on (|ISO/DIS 8601-1:2016(e)|, 31, sec. 4.4 Time interval > 4.4.5 A representation other than complete of a time interval shall be an expression in accordance) ...*

   > *A representation other than complete [i.e. years exceeding four digits, or reduced precision representations] of a time interval shall be an expression in accordance ...*

4. *On qualifieds our target rule CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 11–12, sec. 4.4 Enhanced time interval > 4.4.1 Level 1) ...*

   > *modifier may appear at the end of the date to indicate "uncertain" and/or "approximate".*

5. *On interval shorthands in (|ISO/DIS 8601-1:2016(e)|, 31, sec. 4.4 Time interval, 4.4.5 Representations other than complete) there's provision for them: the end date MAY omit higher order parts, or a timezone designator, that are present in the start date. In that case the parts present in the start date are assumed to apply to the end date. For example,*

   1982-11-30/12-16 // From 1982-11-30 to 1982-12-16

   // From 1982-11-30T07:42:56+11:00 to 1982-12-16T18:34:01+11:00
   1982-11-30T07:42:56+11:00/1982-12-16T18:34:01

   However, given (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 29, sec. C.4.3 Time interval) ...

   > *Either endpoint may be a year, year-month, or year-month-day*

   ... these interval shorthands MUST NOT be used under Annex C.

Unknown in interval rule. The start or end datetime, or both, may be unknown. An unknown datetime in an interval is blank.

```
/1490              // Start datetime unknown.
1982-11/           // End datetime unknown.
/                  // Both datetimes unknown.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 11, sec. 4.4 Enhanced time interval)

Open in interval rule. The start or end datetime, or both, may be open. An open datetime in an interval is represented by a double-dot (. .).

```
../1490            // Start datetime open.
1982-11/..         // End datetime open.
../..              // Both datetimes open.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 11, sec. 4.4 Enhanced time interval)

Mixed unknown and open in interval rule. An interval may have an unknown datetime and an open datetime. There are only two possible forms ...

```
/..                // Start datetime unknown, end datetime open.
../                // Start datetime open, end datetime unknown.
```

CONFORMS with (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|, 30, sec. C.5 Level 1) at Level 1. "Level 1 of this profile requires support for ... all of the features of Level 1 of ISO 8601 Part 2, with the exception of recurring time intervals" and so ...

CONFORMS with (|ISO/DIS 8601-2:2016(e)|, 11, sec. 4.4 Enhanced time interval)

3.2 The Bibliographic Standard-Transformation (The Transformation)

3.2.1 Introduction

From Relationship to other standards:

> "The Bibliographic Standard-Transformation", or "The Transformation" for short, ... is an instance of "A Standard-Transformation". This results in the formats stipulated by "Bibliographic Datetime Format" overall, "BDF" for short...
>
> The Bibliographic Standard-Transformation ... contains rules with the conformance types: DELETING, OVERRIDING and EXTENDING. These apply directly with respect to the preceding Bibliographic ISO 8601 Profile, not directly to (|EDTF 8601 Profile - Annex C in ISO/DIS 8601-2:2016(e)|).

3.2.2 Separators

Overriding date-and-time separator rule. A date-and-time is separated by a capital "T"; *or a space separator. The space separator is ENCOURAGED.*

```
 ...YYYY-MM-DD hh:mm:ss...        // Date-and-time, space separated. ENCOURAGED.
{...YYYY-MM-DDThh:mm:ss...}       // Date-and-time, "T" separated. DISCOURAGED.

 2019-02-28 18:34:01              // Date-and-time, space separated. ENCOURAGED.
{2019-02-28T18:34:01}             // Date-and-time, "T" separated. DISCOURAGED.
```

OVERRIDES "Date-and-time spearator rule" in Separators.

Overriding timezone designator separator rule. Between the date-and-time and a timezone designator: there is no separator; *or there is a space separator. The space separator is ENCOURAGED.*

```
 ...hh:mm:ss (Z|±hh:mm)           // Timezone space separator. ENCOURAGED.
{...hh:mm:ss(Z|±hh:mm)}           // Timezone no separator. DISCOURAGED.

2019-02-28 18:34:01 Z             // Timezone space separator. ENCOURAGED.
2019-02-28 18:34:01 +11:00        // Timezone space separator. ENCOURAGED.
2019-02-28 18:34:01 +11           // Timezone space separator. ENCOURAGED.
1982-11-30 07:42:56 -05:00        // Timezone space separator. ENCOURAGED.

{2019-02-28T18:34:01Z}            // Timezone no separator. DISCOURAGED.
{2019-02-28T18:34:01+11:00}       // Timezone no separator. DISCOURAGED.
{2019-02-28 18:34:01+11}          // Timezone no separator (with date-and-time space
sep.) DISCOURAGED.
{1982-11-30 07:42:56-05:00}       // Timezone no separator (with date-and-time space
sep.) DISCOURAGED.
```

OVERRIDES "Timezone designator separator rule" in Separators.

3.2.3 Date

Overriding years exceeding four digits rule. Years after `9999` or before `-9999` MUST be represented by: the common format; plus *the without-mutual-consent format (with a capital "Y")*.

The common format: if positive, MAY have a plus sign (+) (DISCOURAGED); if negative, MUST have minus sign; more than 4 digits to represent the year; no digit separator (such as a comma); MAY be used for either a date or date-and-time.

Without mutual consent (between parties in the exchange): MUST have a capital "Y" prefix;

```
    ["Y"_YY]YYYY-MM-DD...         // Positive. ENCOURAGED.
{["Y"]+[_YY]YYYY-MM-DD}...        // Positive. DISCOURAGED.

 ["Y"]-[_YY]YYYY-MM-DD...         // Negative.
```

```
  Y52000            // Positive year 52,000, no plus sign. ENCOURAGED
{Y+52000}           // Positive year 52,000, plus sign. DISCOURAGED.

Y-51234             // Negative year 51,235 BCE, minus sign. REQUIRED.

 Y52000-02-28       // Day precision.
 Y52000-02          // Month precision.

 Y52000-02-28 18:34:01 +11:00     // Years exceeding four digits with date-and-time.
```

```
Invalid:
 52000              // Missing "Y" prefix.
+52000              // Missing "Y" prefix.
-51234              // Missing "Y" prefix.
Y52,000             // Digit separator.
```

OVERRIDES "Years exceeding four digits rule" in Date. DELETES the with-mutual-consent (without a capital "Y") format.

3.2.4 Century

Deleting century rule. Centuries *MUST NOT* be represented by two digits.

```
Invalid:
19                  // The twentieth century.
```

A century can, instead, be represented by a datetime interval (e.g. `1900/1999` instead of `19`).

DELETES "Century rule" in Century.

{I do have some prejudice, some unwarranted objection, against the Century rule. So, it would be easy to argue that BDF should not DELETE it.

However, the present value of the "Deleting Century rule" is to illustrate what a DELETING rule looks like}.

3.2.5 Quarter

Extending quarters rule. A quarter is represented by `(Q1)`, `(Q2)`, `(Q3)`, or `(Q4)`. This MAY be used: with a year, alone, or with an unspecified.

```
...YYYY-(Q1|Q2|Q3|Q4)
```

```
2019-Q2     // The second quarter of 2019.
Q2          // The second quarter.

1982-Q4-XX  // A year-quarter, with the day unspecified. Some day in the quarter.
```

EXTENDS the Bibliographic ISO 8601 profile.

{There are a few possible reasons against this format for quarters:

Firstly, in general a sort ascending goes from less precise to more precise, as in:

2019
2019-04
2019-04-15

... but with Quarters that sorting rule breaks ...

2019
2019-04
2019-04-15
2019-Q2

But the same could be said for seasons:

2019
2019-04
2019-04-15
2019-22
2019-Q2

... So if we accept the format for seasons despite breaking a consistency in sort ordering, that seems to open the gate to do so with Quarters.

Secondly, at Level 2 in ("4.7 Divisions of a year" |ISO/DIS 8601-2:2016(e)|, 14) there is a contradicting stipulation:

- *25-28 = Spring - Northern Hemisphere, Summer- Northern Hemisphere, Autumn - Northern Hemisphere, Winter - Northern Hemisphere*
- *29-32 = Spring – Southern Hemisphere, Summer– Southern Hemisphere, Autumn – Southern Hemisphere, Winter - Southern Hemisphere*
- *33-36 = Quarter 1, Quarter 2, Quarter 3, Quarter 4 (3 months each)*
- *37-39 = Quadrimester 1, Quadrimester 2, Quadrimester 3 (4 months each)*
- *40-41 = Semestral 1, Semestral-2 (6 months each)*

Thirdly, Tony Benedetti as an alternative worthy of consideration at https://listserv.loc.gov/cgi-bin/wa?A2=ind1801&L=DATETIME&P=2701

Anyway, the Quarters rule is included here to illustrate what an EXTENDING rule would look like.}

3.2.6 Qualified datetime

Overriding qualification (approximate, uncertain, and approximate-and-uncertain) applicability rule. The qualifications approximate, uncertain, and approximate-and-uncertain, *apply to any datetime, possibly with reduced precision.* ~~*Qualifications MUST NOT be used on date-and-times.*~~ Qualifications only occur at the end of the string and apply to the whole *datetime*.

```
2019-02-28 18:34:01 +11:00~       // Qualification of date-and-time with timezone
designator.
2019-02-28 18:34:01?              // Qualification of date-and-time. Second precision.
2019-02-28 18:34%          // Qualification of date-and-time. Minute precision.
2019-02-28 18~             // Qualification of date-and-time. Hour precision.

2019-02-28?                // Qualification of date. Day precision.
2019-02%                   // Qualification of date. Month precision.
2019~                      // Qualification of date. Year precision.

2019-Q2?                   // Qualification of quarter.
2019-24%                   // Qualification of season.
```

OVERRIDES "Qualification applicability rule" in Qualified date.

3.2.7 Interval

Overriding interval rule. *Any prior datetime* MAY start or end an interval...

- The interval is forward slash (/) separated.
- The end date MUST be later than or equal to the start date.
- Years exceeding four digits MAY be used.
- Qualifiers (approximate, uncertain, and approximate-and-uncertain) MAY be used.
- ~~*Start and end dates MUST NOT be a: date-and-time; or season.*~~
- Interval shorthands MUST NOT be used.

```
["Y"]±[_YY]YYYY-MM-DD~hh:mm:ss~(Z|±hh:mm)/["Y"]±[_YY]YYYY-MM-DD~hh:mm:ss~(Z|±hh:mm)
```

```
1982-11-30 07:42:56 -05:00/2019-02-28 18:34:01 +11:00  // Between date-and-times.
1982-21/2019-22            // Between seasons.
2019-Q1/2019-Q3            // Between quarters.

1982-11-30/2019-02-28      // Between dates with day precision.
1982-11/2019-02            // Between dates with month precision.
1487/1490                  // Between two years.
1982-11-30/2019            // Between two dates, with asymmetric precision.
Y-51234-11-30/Y52000       // Between two dates with years exceeding four digits.

1982-11-30~/2019-02-28?    // Qualified dates at either end.
1982-11-30/2019%           // Qualified date at one end.

Invalid:
1490/1487                  // Start year later than end year.
```

OVERRIDES "Interval Rule" in Interval.

4 Example comparison

4.1 Key

Where BP and BDF examples are different under a rule, they are marked with a "difference marking style". These styles *do not* represent a strict line-by-line, character-by-character, difference (as you'd get with a file diff. program). Rather they have the following meaning:

- *This style is for examples that are different because the target (BDF) rule: has transformed (DELETED, OVERRIDDEN) a source rule; or the transformation results in a rule that EXTENDS BP. In other words, the style marks examples under a rule with rule text that has changed or is novel.*
- **This style is for examples that are different under corresponding rules whose text is **unchanged**. In effect the examples will be different in virtue of having different separators arising from other rules. In other words:**
    - **For VALIDITY comparisons these styled examples in the BP column will remain VALID under the BDF column, but not the other way around. For space separators are valid under BDF but not BP.**
    - **For INVALIDITY comparisons these styled examples in one column remain INVALID in the other. For the exemplified INVALIDITY does not depend on the separators.**

If one example under a rule warrants a difference marking style, then all examples under the rule are similarly styled even if some, or all, of the remaining examples are identical in the other standard's rule. That is, difference marking styles operate at the rule level.

4.2 BP Versus BDF: VALID examples

The following is a comparison between VALID examples in the Bibliographic ISO 8601 profile (BP) and VALID examples in the Bibliographic Datetime Format (BDF) overall. The Bibliographic Datetime Format (BDF) VALID examples are taken by applying The Bibliographic Standard-Transformation to The Bibliographic ISO 8601 profile.

The Bibliographic Datetime Format (BDF) VALID examples, in the right-hand cell, are copied to the Quick Reference. This right-hand cell is to be regarded as the master. Should there be any differences, the Quick Reference should be regarded as in error (in which case please provide Feedback so this can be corrected).

Bibliographic ISO 8601 profile (BP) VALIDS	Bibliographic Datetime Format (BDF) VALIDS
# Date-and-time separator rule *2019-02-28T18:34:01 // Date-and-time, "T" separated.* *2019-02-28T18:34 // Date-and-time, minute precision.* *# Timezone designator separator rule* *2019-02-28T18:34:01Z // Date-and-time, with timezone - Zulu = Universal Time Co-ordinated.* *2019-02-28T18:34:01+11:00 // Date-and-time, with timezone offset - long form.* *2019-02-28T18:34:01+11 // Date-and-time, with timezone offset - short form.* *1982-11-30T07:42:56-05:00 // Date-and-time, with timezone offset - long form, negative.* # Extended format (with hyphen and colon separators) only rule **2019-02-28T18:34:01+11:00 // Extended format** **2019-02-28T18:34 // Extended format** **2019-02 // Extended format** # Reduced precision rule **2019-02-28T18:34:01+11:00 // With timezone.** **2019-02-28T18:34:01+11 // With timezone, offset hour precision.**	*# Overriding date-and-time separator rule* *2019-02-28 18:34:01 // Date-and-time, space separated. ENCOURAGED.* *{2019-02-28T18:34:01} // Date-and-time, "T" separated. DISCOURAGED.* *# Overriding timezone designator separator rule* *2019-02-28 18:34:01 Z // Timezone space separator. ENCOURAGED.* *2019-02-28 18:34:01 +11:00 // Timezone space separator. ENCOURAGED.* *2019-02-28 18:34:01 +11 // Timezone space separator. ENCOURAGED.* *1982-11-30 07:42:56 -05:00 // Timezone space separator. ENCOURAGED.* *{2019-02-28T18:34:01Z} // Timezone no separator. DISCOURAGED.* *{2019-02-28T18:34:01+11:00} // Timezone no separator. DISCOURAGED.* *{2019-02-28 18:34:01+11} // Timezone no separator (with date-and-time space sep.) DISCOURAGED.* *{1982-11-30 07:42:56-05:00} // Timezone no separator (with date-and-time space sep.) DISCOURAGED.* # Extended format (with hyphen and colon separators) only rule **2019-02-28 18:34:01 +11:00 // Extended format** **2019-02-28 18:34 // Extended format** **2019-02 // Extended format** # Reduced precision rule **2019-02-28 18:34:01 +11:00 // With timezone.** **2019-02-28 18:34:01 +11 // With timezone, offset hour precision.**

```
2019-02-28T18:34+11:00       // With timezone, offset minute
precision. Time minute precision.
2019-02-28T18+11:00          // With timezone, offset minute
precision. Time hour precision.

2019-02-28T18:34:01  // Without timezone. Time second precision.
2019-02-28T18:34     // Without timezone. Time minute precision.
2019-02-28T18        // Without timezone. Time hour precision.

2019-02-28                   // Day precision.
2019-02                      // Month precision.
2019                         // Year precision.

# Date rule
2019-02-28                   // A day.
2019-02                      // A month.
2019                         // A year.

# Plus or minus year symbol rule
  2019               // Positive year, no plus sign. ENCOURAGED.
  0125               // Positive year, not long after the year
zero, no plus sign. ENCOURAGED.
{+2019}              // Positive year, plus sign. DISCOURAGED.
{+0125}              // Positive year, plus sign. DISCOURAGED.

 -0379               // Negative year, minus sign, REQUIRED.

# Zero year rule
  0000               // Year zero, ENCOURAGED.
{+0000}              // Year zero, DISCOURAGED.

# Astronomical calendar rule
 0125                // 125 CE. Not long after the year zero.
 0001                //   1 CE.
 0000                // The year zero, or 1 BCE.
-0001                //   2 BCE.
```

```
2019-02-28 18:34 +11:00            // With timezone, offset minute
precision. Time minute precision.
2019-02-28 18 +11:00               // With timezone, offset minute
precision. Time hour precision.

2019-02-28 18:34:01  // Without timezone. Time second precision.
2019-02-28 18:34     // Without timezone. Time minute precision.
2019-02-28 18        // Without timezone. Time hour precision.

2019-02-28                   // Day precision.
2019-02                      // Month precision.
2019                         // Year precision.

# Date rule
2019-02-28                   // A day.
2019-02                      // A month.
2019                         // A year.

# Plus or minus year symbol rule
  2019               // Positive year, no plus sign. ENCOURAGED.
  0125               // Positive year, not long after the year zero,
no plus sign. ENCOURAGED.
{+2019}              // Positive year, plus sign. DISCOURAGED.
{+0125}              // Positive year, plus sign. DISCOURAGED.

 -0379               // Negative year, minus sign, REQUIRED.

# Zero year rule
  0000               // Year zero, ENCOURAGED.
{+0000}              // Year zero, DISCOURAGED.

# Astronomical calendar rule
 0125                // 125 CE. Not long after the year zero.
 0001                //   1 CE.
 0000                // The year zero, or 1 BCE.
-0001                //   2 BCE.
```

```
-0379                // 380 BCE.

# Years exceeding four digits rule

## With mutual consent(without "Y")
  52000              // Positive year 52,000, no plus sign.
ENCOURAGED.
{+52000}             // Positive year 52,000, plus sign.
DISCOURAGED.

 -51234              // Negative 51,235 BCE, minus sign. REQUIRED.

  52000-02           // Month precision.
  52000-02-28        // Day precision.

  52000-02-28T18:34:01+11:00        // Years exceeding four digits
with date-and-time.


## Without mutual consent (with "Y")
  Y52000             // Positive year 52,000, no plus sign.
ENCOURAGED
{Y+52000}            // Positive year 52,000, plus sign.
DISCOURAGED.

 Y-51234             // Negative year 51,235 BCE, minus sign.
REQUIRED

 Y52000-02-28        // Day precision.
 Y52000-02           // Month precision.

  Y52000-02-28T18:34:01+11:00       // Years exceeding four digits
with date-and-time.

# No time only rule
```

```
-0379                // 380 BCE.

# Overriding years exceeding four digits rule

## Without mutual consent (with "Y")
  Y52000             // Positive year 52,000, no plus sign.
ENCOURAGED
{Y+52000}            // Positive year 52,000, plus sign.
DISCOURAGED.

 Y-51234             // Negative year 51,235 BCE, minus sign.
REQUIRED

 Y52000-02-28        // Day precision.
 Y52000-02           // Month precision.

 Y52000-02-28 18:34:01 +11:00       // Years exceeding four digits
with date-and-time.

# No time only rule
```

```
# Time rule
2019-02-28T18:34:01  // Hours, minutes, seconds. Second precision.
2019-02-28T18:34     // Hours, minutes. Minute precision.
2019-02-28T07:42     // Hours, minutes. Leading zero for hour.

# Date-and-time rule
  2019-02-28T18:34:01        // Date-and-time, "T" separated.
Positive ENCOURAGED.
  2019-02-28T18:34           // Date-and-time, minute precision.
Positive ENCOURAGED.

{+2019-02-28T18:34:01}       // Date-and-time, "T" separated.
Positive DISCOURAGED.
{+2019-02-28T18:34}          // Date-and-time, minute precision.
Positive DISCOURAGED.

 -0379-02-28T18:34:01        // Date-and-time, negative years (380
BCE) with second precision.

# Timezone designator rule.
2019-02-28T18:34:01Z         // Date-and-time, with timezone - Zulu
= Universal Time Co-ordinated.

2019-02-28T18:34:01+11:00           // Date-and-time, with timezone
offset - long form.
2019-02-28T18:34:01+11              // Date-and-time, with timezone
offset - short form.
1982-11-30T07:42:56-05:00           // Date-and-time, with timezone
offset - long form, negative.

2019-02-28T18:34+11:00              // Date-and-time, with timezone
offset. Time minute precision.

# Beginning of day rule
2019-02-28T00:00:00          // The beginning of 28th Feb 2019.
Second precision.
```

```
# Time rule
2019-02-28 18:34:01  // Hours, minutes, seconds. Second precision.
2019-02-28 18:34     // Hours, minutes. Minute precision.
2019-02-28 07:42     // Hours, minutes. Leading zero for hour.

# Date-and-time rule
  2019-02-28 18:34:01        // Date-and-time, " " separated.
Positive ENCOURAGED.
  2019-02-28 18:34           // Date-and-time, minute precision.
Positive ENCOURAGED.

{+2019-02-28 18:34:01}       // Date-and-time, " " separated.
Positive DISCOURAGED.
{+2019-02-28 18:34}          // Date-and-time, minute precision.
Positive DISCOURAGED.

 -0379-02-28 18:34:01        // Date-and-time, negative years (380
BCE) with second precision.

# Timezone designator rule.
2019-02-28 18:34:01 Z        // Date-and-time, with timezone - Zulu =
Universal Time Co-ordinated.

2019-02-28 18:34:01 +11:00          // Date-and-time, with timezone
offset - long form.
2019-02-28 18:34:01 +11             // Date-and-time, with timezone
offset - short form.
1982-11-30 07:42:56 -05:00          // Date-and-time, with timezone
offset - long form, negative.

2019-02-28 18:34 +11:00             // Date-and-time, with timezone
offset. Time minute precision.

# Beginning of day rule
2019-02-28 00:00:00          // The beginning of 28th Feb 2019.
Second precision.
```

```
2019-02-28T00:00            // The beginning of 28th Feb 2019. Minute precision.
2019-02-28T00               // The beginning of 28th Feb 2019. Hour precision.

2019-02-28T00:00+11:00      // The beginning of 28th Feb 2019, at a specific timezone

# Absent timezone designator rule
2019-02-28T18:34            // A local datetime, having either: an obvious timezone; or an indeterminate timezone.

# Season rule
2019-21              // Spring of 2019.
2019-22              // Summer of 2019.
2019-23              // Autumn of 2019.
2019-24              // Winter of 2019.

# Unspecified rule
2019-02-XX
2019-XX-XX
XXXX-XX-XX
2019-XX
XXXX-XX
198X
20XX
XXXX

# Century rule
19                   // The twentieth century.
```

```
2019-02-28 00:00            // The beginning of 28th Feb 2019. Minute precision.
2019-02-28 00               // The beginning of 28th Feb 2019. Hour precision.

2019-02-28 00:00 +11:00     // The beginning of 28th Feb 2019, at a specific timezone

# Absent timezone designator rule
2019-02-28 18:34            // A local datetime, having either: an obvious timezone; or an indeterminate timezone.

# Season rule
2019-21                     // Spring of 2019.
2019-22                     // Summer of 2019.
2019-23                     // Autumn of 2019.
2019-24                     // Winter of 2019.

# Unspecified rule
2019-02-XX
2019-XX-XX
XXXX-XX-XX
2019-XX
XXXX-XX
198X
20XX
XXXX

# Deleting Century rule
~~19                // The twentieth century~~

# Extending Quarters rule
2019-Q2             // The second quarter of 2019.
Q2                  // The second quarter.
1982-Q4-XX          // A year-quarter, with the day unspecified. Some day in the quarter.
```

```
# Qualification (approximate, uncertain, and approximate-and-
uncertain) applicability rule




1590-02-28~           // Qualification of day.
1590-02?              // Qualification of month.
1590%                 // Qualification of year.



# Approximate rule
2019-02-28~           // Approximate. Day precision.
1590~                 // Approximate. Often output with the circa
abbreviation, as in "ca. 1590".

# Uncertain rule
2019-02?              // Uncertain. Month precision.
1256?                 // Uncertain.

# Approximate and uncertain rule
2019-02%              // Approximate-and-uncertain. Month precision.
1273%                 // Approximate-and-uncertain.

# Interval rule
```

```
# Overriding qualification (approximate, uncertain, and approximate-
and-uncertain) applicability rule
2019-02-28 18:34:01 +11:00~ // Qualification of date-and-time with
timezone designator.
2019-02-28 18:34:01?        // Qualification of date-and-time.
Second precision.
2019-02-28 18:34%           // Qualification of date-and-time.
Minute precision.
2019-02-28 18~              // Qualification of date-and-time. Hour
precision.

2019-02-28?           // Qualification of date. Day precision.
2019-02%              // Qualification of date. Month precision.
2019~                 // Qualification of date. Year precision.

2019-Q2?              // Qualification of quarter.
2019-24%              // Qualification of season.

# Approximate rule
2019-02-28~   // Approximate. Day precision.
1590~         // Approximate. Often output with the circa
abbreviation, as in "ca. 1590".

# Uncertain rule
2019-02?      // Uncertain. Month precision.
1256?         // Uncertain.

# Approximate and uncertain rule
2019-02%      // Approximate-and-uncertain. Month precision.
1273%         // Approximate-and-uncertain.

# Overriding interval rule
1982-11-30 07:42:56 -05:00/2019-02-28 18:34:01 +11:00    // Between
date-and-times.
1982-21/2019-22             // Between seasons.
```

```
1982-11-30/2019-02-28        // Between dates with day precision.
1982-11/2019-02              // Between dates with month precision.
1487/1490                    // Between two years.
1982-11-30/2019              // Between two dates, with asymmetric
precision.
Y-51234-11-30/Y52000         // Between two dates with years
exceeding four digits.

1982-11-30~/2019-02-28?      // Qualified dates at either end.
1982-11-30/2019%             // Qualified date at one end.

# Unknown in interval rule
/1490                 // Start datetime unknown.
1982-11/              // End datetime unknown.
/                     // Both datetimes unknown.

# Open in interval rule
../1490               // Start datetime open.
1982-11/..            // End datetime open.
../..                 // Both datetimes open.

# Mixed unknown and open in interval rule
/..                   // Start datetime unknown, end datetime open.
../                   // Start datetime open, end datetime unknown.
```

```
2019-Q1/2019-Q3              // Between quarters.

1982-11-30/2019-02-28        // Between dates with day precision.
1982-11/2019-02              // Between dates with month precision.
1487/1490                    // Between two years.
1982-11-30/2019              // Between two dates, with asymmetric
precision.
Y-51234-11-30/Y52000         // Between two dates with years
exceeding four digits.

1982-11-30~/2019-02-28?      // Qualified dates at either end.
1982-11-30/2019%             // Qualified date at one end.

# Unknown in interval rule
/1490                 // Start datetime unknown.
1982-11/              // End datetime unknown.
/                     // Both datetimes unknown.

# Open in interval rule
../1490               // Start datetime open.
1982-11/..            // End datetime open.
../..                 // Both datetimes open.

# Mixed unknown and open in interval rule
/..                   // Start datetime unknown, end datetime open.
../                   // Start datetime open, end datetime unknown.
```

4.3 BP Versus BDF: INVALID examples

The following is a comparison between INVALID examples in the Bibliographic ISO 8601 profile (BP) and the Bibliographic Datetime Format (BDF) overall. The Bibliographic Datetime Format (BDF) INVALID examples are taken by applying The Bibliographic Standard-Transformation to The Bibliographic ISO 8601 profile.

Bibliographic ISO 8601 profile (BP) INVALIDS	Bibliographic Datetime Format (BDF) INVALIDS
# Date-and-time separator rule *2019-02-28 18:34:01 // Date-and-time, space separated.* *# Timezone designator separator rule* *2019-02-28T18:34:01 Z // Timezone separator, space separated.* *2019-02-28T18:34:01 +11:00 // Timezone separator, space separated.* *2019-02-28T18:34:01 11:00 // Timezone separator, space separated.* *Missing sign.* # Extended format (with hyphen and colon separators) only rule **20190228T183401+1100 // Basic format** **20190228T1834 // Basic format** **201902 // Basic format** # Reduced precision rule **18:34:01 // A time without a date.** **2019-02T18:34:01 // Reduced date precision in a date-and-time.** # Date rule 20190228 // "Basic format", with hyphens omitted. 28th Feb 2019 // Customary region specific. 28-02-2019 // Customary region specific ordering. 19-02-28 // Two-digit years. 2019/02/28 // Non-hyphen separator. # Astronomical calendar rule 125 // Three digit year. 0125 CE // Suffixes forbidden. // "-0380" where the author intends "380 BCE". *# Years exceeding four digits rule* *## With mutual consent(without "Y")* *Y52000 // Has "Y" prefix.*	*# Overriding date-and-time separator rule.* *# Overriding timezone designator separator rule.* *2019-02-2 18:34:01 11:00 // Timezone separator, space separated.* *Missing sign.* # Extended format (with hyphen and colon separators) only rule **20190228 183401 +1100 // Basic format** **20190228 1834 // Basic format** **201902 // Basic format** # Reduced precision rule **18:34:01 // A time without a date.** **2019-02 18:34:01 // Reduced date precision in a date-and-time.** # Date rule 20190228 // "Basic format", with hyphens omitted. 28th Feb 2019 // Customary region specific. 28-02-2019 // Customary region specific ordering. 19-02-28 // Two-digit years. 2019/02/28 // Non-hyphen separator. # Astronomical calendar rule 125 // Three digit year. 0125 CE // Suffixes forbidden. // "-0380" where the author intends "380 BCE". *# Overriding years exceeding four digits rule*

```
Y+52000               // Has "Y" prefix.
Y-51234               // Has "Y" prefix.
 52,000               // Digit separator.

## Without mutual consent (with "Y")
 52000                // Missing "Y" prefix.
+52000                // Missing "Y" prefix.
-51234                // Missing "Y" prefix.
Y52,000               // Digit separator.

# No time only rule
18:34:01              // Time without a date.

# Time rule
2019-02-28T183401     // "Basic format", without colon (:) separators.
2019-02-28T7:42       // Omits leading zero in hour.
2019-02-28T07:42 am   // am/pm.


# Time component decimal fraction rule
18:34:01,886          // Seconds fraction. Comma separated.
18:34:01.886          // Seconds fraction. Full stop separated.
18:34,886             // Minutes fraction. Comma separated.
18,886                // Hours fraction. Comma separated.

# Date-and-time rule
20190228T183401       // Basic format
2019-02T18:34:01      // Reduced date precision in a date-and-time.

# Timezone designator rule
2019-02-28T18:34:01 11:00    // Missing timezone sign.

# Beginning of day rule
2019-02-28T24:00:00          // The 24th hour.
2019-02-28T24:00             // The 24th hour.
00:00:00              // A time only.
```

```
## Without mutual consent (with "Y")
 52000                // Missing "Y" prefix.
+52000                // Missing "Y" prefix.
-51234                // Missing "Y" prefix.
Y52,000               // Digit separator.

# No time only rule
18:34:01              // Time without a date.

# Time rule
2019-02-28 183401     // "Basic format", without colon (:)
separators.
2019-02-28 7:42       // Omits leading zero in hour.
2019-02-28 07:42 am   // am/pm.

# Time component decimal fraction rule
18:34:01,886          // Seconds fraction. Comma separated.
18:34:01.886          // Seconds fraction. Full stop separated.
18:34,886             // Minutes fraction. Comma separated.
18,886                // Hours fraction. Comma separated.

# Date-and-time rule
20190228 183401       // Basic format
2019-02 18:34:01      // Reduced date precision in a date-and-time.

# Timezone designator rule
2019-02-28 18:34:01 11:00    // Missing timezone sign.

# Beginning of day rule
2019-02-28 24:00:00   // The 24th hour.
2019-02-28 24:00      // The 24th hour.
00:00:00              // A time only.
```

```
# Season rule
21                    // A season designator on its own.

# Century rule


# Qualification (approximate, uncertain, and approximate-and-
uncertain) applicability rule
2019-02-28T18:34:01~         // Qualification (approximate) of a
date-and-time.

# Interval rule
1982-11-30T07:42/2019-02-28T18:34   // Between date-and-times.
1982-21/2019-22                     // Between seasons.
1490/1487             // Start year later than end year.

1982-11-30/12-16      // Interval shorthand. From 1982-11-30 to 1982-
12-16

// Interval shorthand. From 1982-11-30T07:42:56+11:00 to 1982-12-
16T18:34:01+11:00
1982-11-30T07:42:56+11:00/1982-12-16T18:34:01
```

```
# Season rule
21                    // A season designator on its own.

# Overriding century rule
19                    // The twentieth century.

# Overriding qualification (approximate, uncertain, and approximate-
and-uncertain) applicability rule.


# Overriding interval rule


1490/1487             // Start year later than end year.

1982-11-30/12-16      // Interval shorthand. From 1982-11-30 to 1982-
12-16

// Interval shorthand. From 1982-11-30 07:42:56 +11:00 to 1982-12-16
18:34:01 +11:00
1982-11-30 07:42:56 +11:00/1982-12-16 18:34:01
```

5 References

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