Date and Time Formats

Authors:

Misha Wolf <misha.wolf@reuters.com>
Charles Wicksteed <charles.wicksteed@reuters.com>

Document Status

Status of this document

Abstract

This document defines a profile of ISO 8601, the International Standard for the representation of dates and times. 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. This profile defines a few date/time formats, likely to satisfy most requirements.

Introduction

The International Standard for the representation of dates and times is ISO 8601. Its full reference number is ISO 8601 : 1988 (E), and its title is "Data elements and interchange formats - Information interchange - Representation of dates and times". A [discussion](#) of ISO 8601 has been written by Markus Kuhn.
ISO 8601 describes a large number of date/time formats. For example it defines Basic Format, without punctuation, and Extended Format, with punctuation, and it allows elements to be omitted. This profile defines a restricted range of formats, all of which are valid ISO 8601 dates and times. The aim is to simplify the use of ISO 8601 in World Wide Web-related standards, and to avoid the need for the developers and users of these standards to obtain copies of ISO 8601 itself.

A particular problem with ISO 8601 is that it allows the century to be omitted from years, which is likely to cause trouble as we approach the year 2000. This profile avoids the problem by expressing the year as four digits in all cases.

This profile may be adopted by standards which require an unambiguous representation of dates and times. As different standards have their own requirements regarding granularity and flexibility, this profile offers a number of options. An adopting standard must specify which of these options it permits.

Formats

Different standards may need different levels of granularity in the date and time, so this profile defines six levels. Standards that reference this profile should specify one or more of these granularities. If a given standard allows more than one granularity, it should specify the meaning of the dates and times with reduced precision, for example, the result of comparing two dates with different precisions.
The formats are as follows. Exactly the components shown here must be present, with exactly this punctuation. Note that the "T" appears literally in the string, to indicate the beginning of the time element, as specified in ISO 8601.

```
   Year:
      YYYY (eg 1997)
   Year and month:
      YYYY-MM (eg 1997-07)
   Complete date:
      YYYY-MM-DD (eg 1997-07-16)
   Complete date plus hours and minutes:
      YYYY-MM-DDThh:mmTZD (eg 1997-07-16T19:20+01:00)
   Complete date plus hours, minutes and seconds:
      YYYY-MM-DDThh:mm:ssTZD (eg 1997-07-16T19:20:30+01:00)
   Complete date plus hours, minutes, seconds and a decimal fraction of
a
second
      YYYY-MM-DDThh:mm:ss.sTZD (eg 1997-07-16T19:20:30.45+01:00)
where:
      YYYY = four-digit year
      MM   = two-digit month (01=January, etc.)
```

```
        DD   = two-digit day of month (01 through 31)
        hh   = two digits of hour (00 through 23) (am/pm NOT allowed)
        mm   = two digits of minute (00 through 59)
        ss   = two digits of second (00 through 59)
        s    = one or more digits representing a decimal fraction of a
second
        TZD  = time zone designator (Z or +hh:mm or -hh:mm)
```

This profile does not specify how many digits may be used to represent the decimal fraction of a second. An adopting standard that permits fractions of a second must specify both the minimum number of digits (a number greater than or equal to one) and the maximum number of digits (the maximum may be stated to be "unlimited").

This profile defines two ways of handling time zone offsets:
1. Times are expressed in UTC (Coordinated Universal Time), with a special UTC designator ("Z").
2. Times are expressed in local time, together with a time zone offset in hours and minutes. A time zone offset of "+hh:mm" indicates that the date/time uses a local time zone which is "hh" hours and "mm" minutes ahead of UTC. A time zone offset of "-hh:mm" indicates that the date/time uses a local time zone which is "hh" hours and "mm" minutes behind UTC.

A standard referencing this profile should permit one or both of these ways of handling time zone offsets.

Examples

`1994-11-05T08:15:30-05:00` corresponds to November 5, 1994, 8:15:30 am, US Eastern Standard Time.

`1994-11-05T13:15:30Z` corresponds to the same instant.

Acknowledgments

This document draws on Chris Newman's Internet Draft "Date and Time on the Internet" (draft-newman-datetime-01.txt).