Support for Icalendar Relationships
draft-douglass-ical-relations-03

Abstract

   This specification updates RELATED-TO and introduces new iCalendar
   properties LINK and RELATED-ID to allow better linking and grouping
   of iCalendar components and related data.

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on March 30, 2015.

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1. Introduction

   Icalendar entities often need to be related to each other or to
   associated meta-data. These relationships can take the following
   forms

   Structured iCalendar: Icalendar entities are related to each other
      in some structured way, for example as parent, sibling, before,
      after.

   Grouped iCalendar: Icalendar entities are related to each other as a
      group. CATEGORIES are often used for this purpose but are
      problematic for application developers.

   Linked: Icalendar entities and non-iCalendar entities are linked to
      each other.

1.1. Structured iCalendar relationships

   The currently existing iCalendar [RFC5545] RELATED-TO property has no
   support for temporal relationships as used by standard project
   management tools.

   The RELTYPE parameter is extended to take new values defining
   temporal relationships, a GAP parameter is defined to provide lead
   and lag values and RELATED-TO is extended to allow URI values. These
   changes allows the RELATED-TO property to define a richer set of
   relationships useful for project management.

1.2. Grouped iCalendar relationships

   This specification defines a new RELATED-ID property which allows
   arbitrary groups of entities to be created. This provides a more
   structured approach to categorization, allowing namespaced values and
   providing some assurance for applications that these groupings will
   be preserved.

1.3. Linked relationships

   The currently existing iCalendar standard [RFC5545] lacks a general
   purpose method for referencing additional, external information
   relating to calendar components.

   This document proposes a method for referencing typed external
   information that can provide additional information about an
   iCalendar component. This new LINK property is closely aligned to
   the LINK header defined in [RFC5988]

   The LINK property defines a typed reference or relation to external
   meta-data or related resources. By providing type and format
   information as parameters, clients and servers are able to discover
   interesting references and make use of them, perhaps for indexing or
   the presentation of interesting links for the user.

   It is often necessary to relate calendar components. The current
   RELATED-TO property only allows for a UID which is inadequate for
   many purposes. Allowing other types may help but might raise a
   number of backward compatibility issues. The link property can link
   components in different collections or even on different servers.

   When publishing events it is useful to be able to refer back to the
   source of that information. The actual event may have been consumed
   from a feed or an ics file on a web site. A LINK property can
   provide a reference to the originator of the event.

Beyond the need to relate elements temporally, project management
tools often need to be able to specify the relationships between the
various events and tasks which make up a project. The LINK property
provides such a mechanism.

1.4. Caching and offline use

A section about offline use. Use the link type to identify important
pieces of data.

Client may load subset of data due to e.g. a time-range query.
Should it pull in all the related data?

1.5. Conventions Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and
"OPTIONAL" in this document are to be interpreted as described in
[RFC2119].

2. Qualified Name Syntax

Some property and parameter values need a more "structured" value
than simple text to be defined within a namespace. The syntax
defined here creates a new syntactic element that incorporates a
namespace component and a token component, that togther form a
"qualified" name.

Format Definition:

This syntax is defined by the following notation:

```
    q-name = [ "{" uri "}" ] 1*(ALPHA / DIGIT / "-")
           / x-name
           / iana-token
```

Description: The value is a namespaced value in the style of Clark
   notation [CLARK], that is the namespace is enclosed in braces,
   "{","}". The part following the namespace is defined by the owner
   of that namespace and may be simple text, a path or any
   appropriate text value.

Example:

```
REASON={http://example.org/reasons}delivery-failed

RELATED-ID;RELTYPE={http://example.org/reltypes}tracking-id:
1234-5678

RELATED-ID;RELTYPE={http://example.org/reltypes}type:
{http://example.com/ns}invoice

RELATED-ID;RELTYPE={http://example.com/ical}category:/public/
categories/Arts/Dance
```

3. Reference Types

   The actual reference value can take three forms specified by the type
   parameter

   URI: The default type. This is a URI referring to the target.

   UID: This allows for linking within a single collection and the
      value is assumed to be another component within that collection.

   REFERENCE: An xpointer. In an XML environment it may be necessary
      to refer to an external XML artifact. The XPointer is defined in
      [W3C.WD-xptr-xpointer-20021219] and allows addressing portions of
      XML documents.

4. Link Relation Types

   [RFC5988] defines two form of relation types, registered and
   extension. Registered relation types are added to a registry defined
   by [RFC5988] while extension relation types are specified as unique
   unregistered URIs, (at least unregistered in the [RFC5988] registry).

   The relation types defined here will be registered with IANA in
   accordance with the specifications in [RFC5988].

5. Redefined Relation Type Value

   Relationship parameter type values are defined in section 3.2.15. of
   [RFC5545]. This specification redefines that type to include the new
   temporal relationship values FINISHTOSTART, FINISHTOFINISH,
   STARTTOFINISH and STARTTOSTART. It also adds the DEPENDS-ON value to
   provide a link to an component upon which the current component
   depends.

   Format Definition:

This property parameter is defined by the following notation:

```
reltypeparam        = "RELTYPE" "="
                       ("PARENT"    ; Parent relationship - Default
                      / "CHILD"     ; Child relationship
                      / "SIBLING"   ; Sibling relationship
                      / "DEPENDS-ON" ; refers to previous task
                      / "REFID"     ; Relationship based on REFID
                      / "FINISHTOSTART" ;  Temporal relationship
                      / "FINISHTOFINISH" ;  Temporal relationship
                      / "STARTTOFINISH" ;  Temporal relationship
                      / "STARTTOSTART" ;  Temporal relationship
                      / iana-token  ; Some other IANA-registered
                                    ; iCalendar relationship type
                      / x-name)     ; A non-standard, experimental
                                    ; relationship type
```

Description: This parameter can be specified on a property that
   references another related calendar component. The parameter may
   specify the hierarchical relationship type of the calendar
   component referenced by the property when the value is PARENT,
   CHILD or SIBLING. If this parameter is not specified on an
   allowable property, the default relationship type is PARENT.
   Applications MUST treat x-name and iana-token values they don't
   recognize the same way as they would the PARENT value.

   It defines the temporal relationship when the value is one of the
   project management standard relationships FINISHTOSTART,
   FINISHTOFINISH, STARTTOFINISH or STARTTOSTART. This property will
   be present in the predecessor entity and will refer to the
   successor entity. The GAP parameter specifies the lead or lag
   time between the predecessor and the successor. In the
   description of each temporal relationship below we refer to Task-A
   which contains and controls the relationship and Task-B the target
   of the relationship.

RELTYPE=PARENT: Identifies the referenced calendar component is a
   superior of calendar component

RELTYPE=CHILD: Indicates that the referenced calendar component is a
   subordinate of the calendar component.

RELTYPE=SIBLING: Indicates that the referenced calendar component is
   a peer of the calendar component.

RELTYPE=DEPENDS-ON: Indicates that the current calendar component
   depends on the referenced calendar component in some manner. For

example a task may be blocked waiting on the other, referenced,
task.

RELTYPE=REFID: Establishes a reference from the current component to
components with a REFID property which matches the value given in
the associated RELATED-TO property.

RELTYPE=FINISHTOSTART: Task-B cannot start until Task-A finishes.
For example, when sanding is complete, painting can begin.

```
                ============
                |  Task-A  |--+
                ============  |
                              |
                              V
                         ============
                         |  Task-B  |
                         ============
```
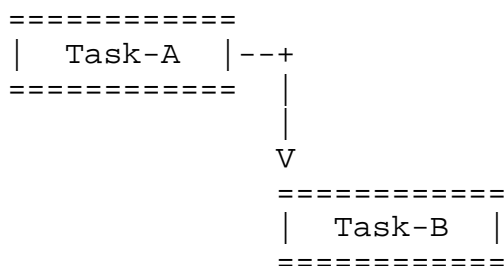
Figure 1: Finish to start relationship

RELTYPE=FINISHTOFINISH: Task-B cannot finish before Task-A is
finished, that is the end of Task-A defines the end of Task-B.
For example, we start the potatoes, then the meat then the peas
but they should all be cooked at the same time.

```
                ============
                |  Task-A  |--+
                ============  |
                              |
                ============  |
                |  Task-B  |<-+
                ============
```

Figure 2: Finish to finish relationship

RELTYPE=STARTTOFINISH: The start of Task-A (which occurs after Task-
B) controls the finish of Task-B. For example, ticket sales
(Task-B) end when the game starts (Task-A).

```
                            ============
                       +--|   Task-A   |
                       |   ============
                       |
          ============ |
         |   Task-B   |<-+
          ============
```

               Figure 3: Start to finish relationship

   RELTYPE=STARTTOSTART: The start of Task-A triggers the start of
      Task-B, that is Task-B can start anytime after Task-A starts.


```
             ============
        +--|   Task-A   |
        |   ============
        |
        |   ============
        +->|   Task-B   |
            ============
```

                Figure 4: Start to start relationship

6. New Property Parameters

6.1. Rel

   Parameter name: REL

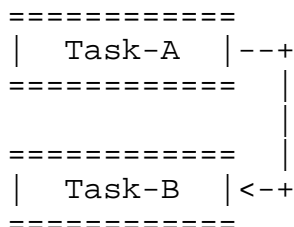   Purpose: To specify the relationship of data referenced by a LINK
      property.

   Format Definition:

   This parameter is defined by the following notation:

```
      relparam      = "REL" "="
                        ("SOURCE"         ; Link to source of this component
                       / DQUOTE uri DQUOTE
                       / x-name           ; Experimental reference type
                       / iana-token)      ; Other IANA registered type
```

   Description: This parameter MUST be specified on all LINK
      properties, and defines the type of reference. This allows
      programs consuming this data to automatically scan for references
      they support. In addition to the values defined here any value

defined in [RFC5988] may be used. There is no default relation
type.

REL=SOURCE: identifies the source of the event information.

Registration: These relation types are registered in [RFC5988]

6.2. Gap

Parameter name: GAP

Purpose: To specify the length of the gap, positive or negative
between two temporally related components.

Format Definition:

This parameter is defined by the following notation:

    gapparam   = "GAP" "=" dur-value

Description: This parameter MAY be specified on the RELATED-TO
property, and defines the duration of time between the predecessor
and successor in an interval. When positive it defines the lag
time between a task and its logical successor. When negative it
defines the lead time.

An example of lag time might be if task A is "paint the room" and
task B is "hang the drapes" then task A may be related to task B
with RELTYPE=FINISHTOSTART with a gap long enough for the paint to
dry.

An example of lead time might be to relate a 1 week task A to the
end of task B with RELTYPE=STARTTOFINISH and a negative gap of 1
week so they finish at the same time.

6.3. Title

Parameter name: TITLE

Purpose: To provide a human readable title.

Format Definition:

This parameter is defined by the following notation:

    titleparam   = "TITLE" "=" text

   Description: This parameter MAY be specified on all LINK properties,
      and provides a human readable label, perhaps for icons or links..

7. New Parameter Values

   This specification defines a new value to be used with the VALUE
   property parameter:

   UID VALUE=UID indicates that the associated value is the UID for a
      component.

   REFERENCE VALUE=REFERENCE indicates that the associated value is an
      xpointer referencing an associated XML artifact.

8. New Properties

8.1. Link

   Property name: LINK

   Purpose: This property provides a reference to external information
      about a component.

   Value type: URI, TEXT or REFERENCE

   Property Parameters: Non-standard, reference type or format type
      parameters can be specified on this property.

   Conformance: This property MAY be specified in any iCalendar
      component.

   Description: When used in a component the value of this property
      points to additional information related to the component. For
      example, it may reference the originating web server.

   Format Definition:

This property is defined by the following notation:

```
   link                = "LINK" linkparam ":" ( ":" uri ) /
                         (
                           ";" "VALUE" "=" "REFERENCE"
                           ":" text
                         )
                         CRLF


   linkparam           = *(

                         ; the following is MANDATORY
                         ; and MAY occur more than once

                         (";" relparam) /

                         ; the following are MANDATORY
                         ; but MUST NOT occur more than once

                         (";" fmttypeparam) /
                         (";" titleparam) /

                         ; the following is OPTIONAL
                         ; and MAY occur more than once

                         (";" xparam)

                         )
```

   Example:

   The following is an example of this property. It points to a server
   acting as the source for the calendar object.

```
                  LINK;REL=SOURCE;TITLE=The Egg:
                    http://example.com/events
```

8.2. Refid

   Property name: REFID

   Purpose: This property allows iCalendar entities to be grouped.

   Value type: Q-NAME

   Property Parameters: Non-standard parameters can be specified on
      this property.

   Conformance: This property MAY be specified multiple times in any
      iCalendar component.

   Description: The value of this property is a namespaced value using
      Clark notation, that is the namespace is enclosed in braces, "{",
      "}". The part following the namespace is defined by the owner of
      that namespace and may be simple text, a path or any appropriate
      text value.

      In effect this property provides a more controlled categorization
      of calendar entities.

      A CUA MUST preserve any REFID property with a namespace it does
      not recognize or own. This allows other CUAs to use the REFID to
      define groups which only have significance to that application.
      For example, a project management tool may flag all tasks that
      form part of a specific project, or an itinerary tool may flag all
      events that are part of an itinerary.

   Format Definition:

   This property is defined by the following notation:

      refid   = "REFID" refidparam ":" q-name CRLF

      refidparam   = *(

                       ; the following is OPTIONAL
                       ; and MAY occur more than once

                       (";" xparam)

)

   Example:

   The following is an example of this property. It defines an id in
   the org.calconnect namespace.

      REFID:{org.calconnect.project}Main-Project

9. Redefined RELATED-TO Property

9.1. RELATED-TO

   Property name: RELATED-TO

   Purpose: This property is used to represent a relationship or
      reference between one calendar component and another. The
      definition here extends the definition in Section 3.8.4.5. of
      [RFC5545] by allowing URI values adn a GAP parameter.

   Value type: URI or TEXT

   Property Parameters: Non-standard, reference type, gap, value or
      format type parameters can be specified on this property.

   Conformance: This property MAY be specified in any iCalendar
      component.

   Description: By default or when VALUE=UID is specified, the property
      value consists of the persistent, globally unique identifier of
      another calendar component. This value would be represented in a
      calendar component by the "UID" property.

      By default, the property value points to another calendar
      component that has a PARENT relationship to the referencing
      object. The "RELTYPE" property parameter is used to either
      explicitly state the default PARENT relationship type to the
      referenced calendar component or to override the default PARENT
      relationship type and specify either a CHILD or SIBLING
      relationship or a temporal relationship.

      The PARENT relationship indicates that the calendar component is a
      subordinate of the referenced calendar component. The CHILD
      relationship indicates that the calendar component is a superior
      of the referenced calendar component. The SIBLING relationship
      indicates that the calendar component is a peer of the referenced
      calendar component.

      The FINISHTOSTART, FINISHTOFINISH, STARTTOFINISH or STARTTOSTART
      relationships define temporal relationships as specified in the
      reltype parameter definition.

      Changes to a calendar component referenced by this property can
      have an implicit impact on the related calendar component. For
      example, if a group event changes its start or end date or time,
      then the related, dependent events will need to have their start
      and end dates changed in a corresponding way. Similarly, if a

PARENT calendar component is cancelled or deleted, then there is
an implied impact to the related CHILD calendar components. This
property is intended only to provide information on the
relationship of calendar components. It is up to the target
calendar system to maintain any property implications of this
relationship.

Format Definition:

This property is defined by the following notation:

```
related     = "RELATED-TO" relparam ( ":" text ) /
              (
                ";" "VALUE" "=" "UID"
                ":" uid
              )
              (
                ";" "VALUE" "=" "URI"
                ":" uri
              )
              CRLF

relparam    = *(
              ;
              ; The following are OPTIONAL,
              ; but MUST NOT occur more than once.
              ;
              (";" reltypeparam) /
              (";" gapparam) /
              ;
              ; The following is OPTIONAL,
              ; and MAY occur more than once.
              ;
              (";" other-param)
              ;
              )
```

Example:

The following are examples of this property.

```
RELATED-TO:jsmith.part7.19960817T083000.xyzMail@example.com

RELATED-TO:19960401-080045-4000F192713-0052@example.com

RELATED-TO;VALUE=URI;RELTYPE=STARTTOFINISH:
 http://example.com/caldav/user/jb/cal/
 19960401-080045-4000F192713.ics
```

10. Security Considerations

Applications using the LINK property need to be aware of the risks entailed in using the URIs provided as values. See [RFC3986] for a discussion of the security considerations relating to URIs.

11. IANA Considerations

12. Acknowledgements

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13. Normative References

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Appendix A. Change log

   V02: 2013-11-22 MD

   o Added more description to GAP

   V01: 2013-09-26 MD

   o Removed "Improved" from title

   o Fixed typos and examples

   o Removed gap param from link

   2013-06-02 MD Initial version

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