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Support for Icalendar Relationships  
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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.

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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. 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.

### 3. 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].

#### 4. 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
                    / "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=FINISHTOSTART: Task-B cannot start until Task-A finishes. For example, when sanding is complete, painting can begin.

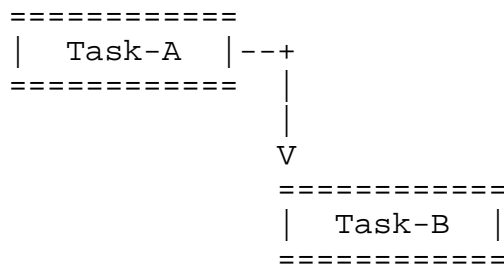


Figure 1: Finish to start relationship

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.

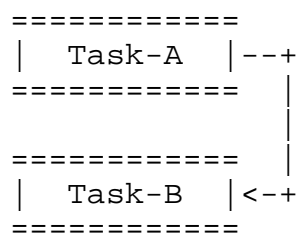


Figure 2: Finish to finish relationship

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).

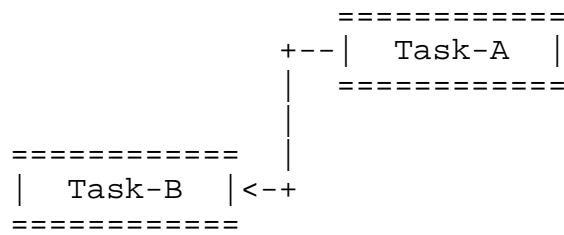


Figure 3: Start to finish relationship

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

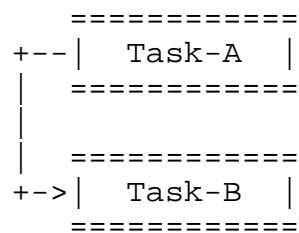


Figure 4: Start to start relationship

## 5. New Property Parameters

## 5.1. 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]

## 5.2. 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.

## 5.3. 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..

## 6. 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.

## 7. New Properties

### 7.1. 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

```

## 7.2. Related-id

Property name: RELATED-ID

Purpose: This property allows iCalendar entities to be grouped.

Value type: TEXT

**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 RELATED-ID property with a namespace it does not recognize or own. This allows other CUAs to use the RELATED-ID 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:

```
related-id      = "RELATED-ID" relidparam ":" text CRLF

relidparam      = *(
                    ; 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.

```
RELATED-ID:{org.calconnect.project}Main-Project
```

## 8. Redefined RELATED-TO Property

### 8.1. 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 and 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
```

## 9. 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.

## 10. IANA Considerations

## 11. Acknowledgements

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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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