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Event Publishing Extensions to iCalendar

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Abstract

This specification updates RFC5545 by introducing a number of new iCalendar properties and components which are of particular use for event publishers and in social networking.

This specification also defines a new STRUCTURED-DATA property for iCalendar RFC5545 to allow for data that is directly pertinent to an event or task to be included with the calendar data.

Status of This Memo

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Table of Contents

1. Introduction
   1.1. Conventions Used in This Document
   1.2. Terms Used in This Document
2. Components and properties
3. Typed References
   3.1. Use Cases
      3.1.1. Piano Concert Performance
      3.1.2. Itineraries
         3.1.2.1. Reserving facilities
4. Modifications to Calendar Components
5. New Property Parameters
   5.1. Order
   5.2. Schema
   5.3. Derived
6. New Properties
   6.1. Location Type
   6.2. Participant Type
   6.3. Resource Type
   6.4. Calendar Address
   6.5. Styled-Description
   6.6. Structured-Data
7. New Components
   7.1. Participant
      7.1.1. Schedulable Participant
   7.2. Location
   7.3. Resource
8. Extended examples
   8.1. Example 1
   8.2. Example 2
9. Security Considerations
   9.1. URIs
   9.2. Malicious Content
   9.3. HTML Content
10. Privacy Considerations
   10.1. Tracking
   10.2. Revealing Locations
11. IANA Considerations
   11.1. Additional iCalendar Registrations
      11.1.1. Properties
      11.1.2. Parameters
      11.1.3. Components
   11.2. New Registration Tables
      11.2.1. Participant Types
      11.2.2. Resource Types
12. Acknowledgements
13. Normative References

Appendix A. Open issues

Appendix B. Change log

Author's Address

1. Introduction

The currently existing iCalendar standard [RFC5545] lacks useful methods for referencing additional, external information relating to calendar components. Additionally there is no standard way to provide rich text descriptions or meta-data associated with the event.

Current practice is to embed this information as links in the description or to add non-standard properties as defined in [RFC5545] section 3.8.8.2.

This document updates [RFC5545] to define a number of properties and components referencing such external information that can provide additional information about an iCalendar component. The intent is to allow interchange of such information between applications or systems (e.g., between clients, between client and server, and between servers). Formats such as vCard [RFC2426] are likely to be most useful to the receivers of such events as they may be used in other applications - such as address books.

1.1. 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 BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

1.2. Terms Used in This Document

Event:
: When the (perhaps with a capitalised 'E') word 'event' is used we are referring to gatherings, formal or informal. For example a sports event, a party or a concert.

Social Calendaring:
: Historically, calendar data and scheduling has been heavily biased towards meetings in a corporate environment. Some of the features defined in this document are to support a more informal, i.e. social, model. For example, we may want to record who is participating in a public event.

2. Components and properties

Previous extensions to the calendaring standards have been largely restricted to the addition of properties or parameters. This is partly because iCalendar libraries had trouble handling components nested deeper than those defined in [RFC5545].

In a break with this 'tradition' this specification defines a number of components rather than properties. This is a better match for the way [W3C.REC-xml-20081126] and JSON [RFC8259] handle such structures and allows richer definitions.

It also allows for the addition of extra properties inside the components and resolves some of the problems of trying to add detailed information as a parameter.

3. Typed References

The properties and components defined here can all reference external meta-data which may be used by applications to provide further information to users. By providing type information, clients and servers are able to discover interesting references and make use of them, perhaps for indexing or the presenting of additional related information for the user.

As always, clients should exercise caution in following references to external data.

The [RFC5545] LOCATION property provides only an unstructured single text value for specifying the location where an event (or task) will occur. This is inadequate for use cases where structured location information (e.g. address, region, country, postal code) is required or preferred, and limits widespread adoption of iCalendar in those settings.

Using the VLOCATION component, rich information about multiple locations can be communicated in a STRUCTURED-DATA property, for example, address, region, country, postal code as well as other information such as parking availability, nearby restaurants and the venue. Servers and clients can retrieve the objects when storing the event and use them to index by geographic location.

When a calendar client receives a calendar component it can search the set of locations looking for those of particular interest. The LOCATION-TYPE property and STRUCTURED-DATA FMTTYPE parameter, if supplied, can be used to help the selection.

The PARTICIPANT component is designed to handle common use cases in event publication. It is generally important to provide information about the organizers of such events. Sponsors wish to be referenced in a prominent manner. In social calendaring it is often important to identify the active participants in the event, for example a school sports team, and the inactive participants, for example the parents.

The PARTICIPANT component can be used to provide useful extra data about an attendee. For example a location inside the PARTICIPANT gives the actual location of a remote attendee. (But see the note about privacy.)

Alternatively the PARTICIPANT component can be used to provide a reference - perhaps the address for mailing lists.

3.1. Use Cases

The main motivation for these changes has been event publication but there are opportunities for use elsewhere. The following use cases will describe some possible scenarios.

3.1.1. Piano Concert Performance

In putting together a concert there are many participants: piano tuner, performer, stage hands etc. In addition there are sponsors and various contacts to be provided. There will also be a number of related locations. A number of events can be created, all of which relate to the performance in different ways.

There may be an iTip [RFC5546] meeting request for the piano tuner who will arrive before the performance. Other members of staff may also receive meeting requests.

An event can also be created for publication which will have a PARTICIPANT component for the pianist providing a reference to vCard [RFC2426] information about the performer. This event would also hold information about parking, local subway stations and the venue itself. In addition, there may be sponsorship information for sponsors of the event and perhaps paid sponsorship properties essentially advertising local establishments.

3.1.2. Itineraries

These additions also provide opportunities for the travel industry. When booking a flight the PARTICIPANT component can be used to provide references to businesses at the airports and to car hire businesses at the destination.

The embedded location information can guide the traveler at the airport or to their final destination. The contact information can provide detailed information about the booking agent, the airlines, car hire companies and the hotel.

3.1.2.1. Reserving facilities

For a meeting, the size of a room and the equipment needed depends to some extent on the number of attendees actually in the room.

A meeting may have many attendees none of which are co-located. The current ATTENDEE property does not allow for the addition of such meta-data. The PARTICIPANT component allows attendees to specify their location.

4. Modifications to Calendar Components

```
; Addition of PARTICIPANT, VLOCATION and VRESOURCE
; as valid components
eventc     = "BEGIN" ":" "VEVENT" CRLF
             eventprop *alarmc *participantc *locationc *resourcec
             "END" ":" "VEVENT" CRLF

; Addition of properties STYLED-DESCRIPTION and STRUCTURED-DATA
eventprop  =/ *styleddescription
              *sdataprop

; Addition of PARTICIPANT, VLOCATION and VRESOURCE
; as valid components
todoc      = "BEGIN" ":" "VTODO" CRLF
             todoprop *alarmc *participantc *locationc *resourcec
             "END" ":" "VTODO" CRLF

; Addition of properties STYLED-DESCRIPTION, STRUCTURED-DATA
todoprop =/ *styleddescription
            *sdataprop

; Addition of PARTICIPANT, VLOCATION and VRESOURCE
; as valid components
journalc   = "BEGIN" ":" "VJOURNAL" CRLF
             jourprop *participantc *locationc *resourcec
             "END" ":" "VJOURNAL" CRLF

; Addition of properties STYLED-DESCRIPTION, STRUCTURED-DATA
jourprop =/ *styleddescription
            *sdataprop

; Addition of PARTICIPANT, VLOCATION and VRESOURCE
; as valid components
freebusyc  = "BEGIN" ":" "VFREEBUSY" CRLF
             fbprop *participantc *locationc *resourcec
             "END" ":" "VFREEBUSY" CRLF

; Addition of property STYLED-DESCRIPTION
fbprop     =/ *styleddescription
```

The following changes to the syntax defined in iCalendar are made here. New elements are defined in subsequent sections.

5. New Property Parameters

5.1. Order

This parameter is defined by the following notation:

```
orderparam    = "ORDER" "=" integer
                ;          Must be greater than or equal to 1
```

Parameter name:

ORDER

Purpose:

To define ordering for the associated property.

Format Definition:

Description:

The ORDER parameter is OPTIONAL and is used to indicate the relative ordering of the corresponding instance of a property. Its value MUST be an integer greater than or equal to 1 that specifies the order with 1 being the first in the ordering.

When the parameter is absent, the default MUST be to interpret the property instance as being ordered last, that is, the property will appear after any other instances of the same property with any value of ORDER.

When any ORDER parameters have the same value all the associated properties appear as a group within which there is no defined order.

Note that the value of this parameter is to be interpreted only in relation to values assigned to other corresponding instances of the same property in the same entity.

This parameter MUST NOT be applied to a property that does not allow multiple instances.

Example uses:

The ORDER may be applied to the PARTICIPANT-TYPE property to indicate the relative importance of the participant, for example as a sponsor or a performer. For example, ORDER=1 could define the principal performer or soloist.

5.2. Schema

This parameter is defined by the following notation:

```
schemaparam    = "SCHEMA" "=" DQUOTE uri DQUOTE
```

```
STRUCTURED-DATA;FMTTYPE=application/ld+json;
 SCHEMA="https://schema.org/FlightReservation";
 ENCODING=BASE64;VALUE=BINARY:ICAgIDxzY3JpcHQgdHlwZT0iYXBwb
 GljYXRpb24vbGQranNvbiI+CiAgICB7CiAgICAgICJAY29
 udGV4dCI6ICJodHRwOi8vc2NoZW1hLm9yZyIsCiAgICAgICJAdHlwZSI
 6ICJGbGlnaHRSZXNlcnZhdGlvbiIsCiAgICAgICJyZXNlcnZhdGlvbkl
 kIjogIlJYSjM0UCIsCiAgICAgICJyZXNlcnZhdGlvblN0YXR1cyI6ICJ
 odHRwOi8vc2NoZW1hLm9yZy9SZXNlcnZhdGlvbkNvbmZpcm1lZCIsCiA
 gICAgICJwYXNzZW5nZXJQcmlvcml0eVN0YXR1cyI6ICJGYXN0IFRyYWN
 rIiwKICAgICAgInBhc3NlbmdlclNlcXVlbmNlTnVtYmVyIjogIkFCQzE
 yMyIsCiAgICAgICJzZWN1cml0eVNjcmVlbmluZyI6ICJUU0EgUHJlQ2h
 lY2siLAogICAgICAidW5kZXJOYW1lIjogewogICAgICAgICJAdHlwZSI
 6ICJQZXJzb24iLAogICAgICAgICJuYW1lIjogIkV2YSBHcmVlbiIKICA
 gICAgfSwKICAgICAgInJlc2VydmF0aW9uRm9yIjogewogICAgICAgICJ
 AdHlwZSI6ICJGbGlnaHQiLAogICAgICAgICJmbGlnaHROdW1iZXIiOiA
 iVUExMTAiLAogICAgICAgICJwcm92aWRlciI6IHsKICAgICAgICAgICJ
 AdHlwZSI6ICJBaXJsaW5lIiwKICAgICAgICAgICJuYW1lIjogIkNvbnR
 pbmVudGFsIiwKICAgICAgICAgICJpYXRhQ29kZSI6ICJDTyIsCiAgICA
 gICAiYm9hcmRpbmdQb2xpY3kiOiAiaHR0cDovL3NjaGVtYS5vcmc
```

```
vWm9uZUJvYXJkaW5nUG9saWN5IgogICAgICAgIH0sCiAgICAgICAgInN
lbGxlciI6IHsKICAgICAgICAgICJAdHlwZSI6ICJBaXJsaW5lIiwKICA
gICAgICAgICJuYW1lIjogIlVuaXRlZCIsCiAgICAgICAgICAiaWF0YUN
vZGUiOiAiVUEiCiAgICAgICAgfSwKICAgICAgICAiZGVwYXJ0dXJlQWl
ycG9ydCI6IHsKICAgICAgICAgICJAdHlwZSI6ICJBaXJwb3J0IiwKICA
gICAgICAgICJuYW1lIjogIlNhbiBGcmFuY2lzY28gQWlycG9ydCIsCiA
gICAgICAgICAiaWF0YUNvZGUiOiAiU0ZPIgogICAgICAgIH0sCiAgICA
gICAgImRlcGFydHVyZVRpbWUiOiAiMjAxNy0wMy0wNFQyMDoxNTowMC0
wODowMCIsCiAgICAgICAgICAgImFycml2YWxBaXJwb3J0IjogewogICAgICA
gICAgIkB0eXBlIjogIkFpcnBvcnQiLAogICAgICAgICAgIm5hbWUiOiA
iSm9obiBGLiBLZW5uZWR5IEludGVybmF0aW9uYWwgQWlycG9ydCIsCiA
gICAgICAgICAiaWF0YUNvZGUiOiAiSkZLIgogICAgICAgIH0sCiAgICA
gICAgImFycml2YWxUaW1lIjogIjIwMTctMDMtMVUMDY6MzA6MDAtMDU
6MDAiCiAgICAgICAgIH0KICAgIH0KICAgIDwvc2NyaXB0Pg==
```

Parameter Name:

SCHEMA

Purpose:

To specify the schema used for the content of a "STRUCTURED-DATA" property value.

Format Definition:

Description:

This property parameter SHOULD be specified on "STRUCTURED-DATA" properties. When present it provides identifying information about the nature of the content of the corresponding "STRUCTURED-DATA" property value. This can be used to supplement the media type information provided by the "FMTTYPE" parameter on the corresponding property.

Example:

5.3. Derived

This parameter is defined by the following notation:

```
derivedparam    = "DERIVED" "=" ("TRUE" / "FALSE")
; Default is FALSE
```

```
STYLED-DESCRIPTION;FMTTYPE=text/html;
 DERIVED=TRUE:<html>...</html>
```

Parameter Name:

DERIVED

Purpose:

To specify that the value of the associated property is derived from some other property value or values.

Format Definition:

Description:

This property parameter MAY be specified on any property when the value is derived from some other property or properties. When present with a value of TRUE clients MUST NOT update the property.

As an example, if a STYLED-DESCRIPTION property is present with FMTTYPE="application/rtf" then there may be an additional STYLED-DESCRIPTION property with FMTTYPE="text/html" and DERIVED=TRUE and a value created from the rtf value.

Example:

6. New Properties

This specification makes use of the NAME property which is defined in [RFC7986]

6.1. Location Type

This property is defined by the following notation:

```
loctype      = "LOCATION-TYPE" loctypeparam ":"
               text *("," text)
               CRLF

loctypeparam   = *(";" other-param)
```

Property name:

LOCATION-TYPE

Purpose:

To specify the type(s) of a location.

Value type:

The value type for this property is TEXT. The allowable values are defined below.

Description:

This property MAY be specified in VLOCATION components and provides a way to differentiate multiple locations. For example, it allows event producers to provide location information for the venue and the parking.

Format Definition:

Multiple values may be used if the location has multiple purposes, for example a hotel and a restaurant.

Values for this parameter are taken from the values defined in [RFC4589] section 3. New location types SHOULD be registered in the manner laid down in section 5 of that specification.

6.2. Participant Type

This property is defined by the following notation:

```
participanttype   = "PARTICIPANT-TYPE" partvalueparam ":"
                    partvalue CRLF

partvalue     = ("ACTIVE"
              / "INACTIVE"
              / "SPONSOR"
              / "CONTACT"
              / "BOOKING-CONTACT"
              / "EMERGENCY-CONTACT"
              / "PUBLICITY-CONTACT"
              / "PLANNER-CONTACT"
              / "PERFORMER"
              / "SPEAKER"
              / iana-token)     ; Other IANA-registered
                                ; values

partvalueparam   = *(";" other-param)
```

The following is an example of this property:

```
PARTICIPANT-TYPE:SPEAKER
```

Property name:
PARTICIPANT-TYPE

Purpose:
To specify the type of participant.

Value type:
The value type for this property is TEXT. The allowable values are defined below.

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

Conformance:
This property MUST be specified once within a PARTICIPANT component.

Description:
This property defines the type of participation in events or tasks. Participants can be individuals or organizations, for example a soccer team, the spectators, or the musicians.

Format Definition:

Example:

The registered values for the PARTICIPANT-TYPE property have the meanings described here:

ACTIVE:
A participant taking an active role - for example a team member.

INACTIVE:
A participant taking an inactive role - for example an audience member.

SPONSOR:
A sponsor of the event. The ORDER parameter may be used with this participant type to define the relative order of multiple sponsors.

CONTACT:
Contact information for the event. The ORDER parameter may be used with this participant type to define the relative order of multiple contacts.

BOOKING-CONTACT:
Contact information for reservations or payment

EMERGENCY-CONTACT:
Contact in case of emergency

PUBLICITY-CONTACT:
Contact for publicity

PLANNER-CONTACT:
Contact for the event planner or organizer

PERFORMER:
A performer - for example the soloist or the accompanist. The ORDER parameter may be used with this participant type to define the relative order of multiple performers. For example, ORDER=1 could define the principal performer or soloist.

SPEAKER:
Speaker at an event

6.3. Resource Type

This property is defined by the following notation:

```
restypeprop   = "RESOURCE-TYPE" restypeparam ":"
                restypevalue CRLF

restypevalue  = ("ROOM"
                / "PROJECTOR"
                / "REMOTE-CONFERENCE-AUDIO"
                / "REMOTE-CONFERENCE-VIDEO"
                / iana-token)     ; Other IANA-registered
                ; values

restypeparam   = *(";" other-param)
```

Property name:

RESOURCE-TYPE

Purpose:

To specify the type of resource.

Value type:

The value type for this property is TEXT. The allowable values are defined below.

Format Definition:

Description:

This property MAY be specified in VRESOURCE components and provides a way to differentiate multiple resources.

The registered values are described below. New resource types SHOULD be registered in the manner laid down in this specification.

ROOM:

A room for the event/meeting.

PROJECTOR:

Projection equipment.

REMOTE-CONFERENCE-AUDIO:

Audio remote conferencing facilities.

REMOTE-CONFERENCE-VIDEO:

Video remote conferencing facilities.

6.4. Calendar Address

This property is defined by the following notation:

```
calendaraddress   = "CALENDAR-ADDRESS" caladdressparam ":"
                    cal-address CRLF

 caladdressparam   = *(";" other-param)
```

Property name:

CALENDAR-ADDRESS

Purpose:

To specify the calendar address for a participant.

Value type:

CAL-ADDRESS

Property Parameters:

IANA-registered, or non-standard property parameters can be specified on this property.

Conformance:

This property MAY be specified once within a PARTICIPANT component.

Description:

This property provides a calendar user address for the participant. If there is an ATTENDEE property with the same value then the participant is schedulable.

Format Definition:

6.5. Styled-Description

This property is defined by the following notation:

```
styleddescription = "STYLED-DESCRIPTION" styleddescparam ":"
                    styleddescval CRLF

styleddescparam   = ; the elements herein may appear in any order,
                    ; and the order is not significant.

                    (";" "VALUE" "=" ("URI" / "TEXT"))

                    [";" altrepparam]
                    [";" languageparam]
                    [";" fmttypeparam]
                    [";" derivedparam]

                    *(";" other-param)

styleddescval   = ( uri / text )
;Value MUST match value type
```

The following is an example of this property. It points to an html description.

```
STYLED-DESCRIPTION;VALUE=URI:http://example.org/desc001.html
```

Property name:

STYLED-DESCRIPTION

Purpose:

This property provides for one or more rich-text descriptions to replace that provided by the DESCRIPTION property.

Value type:

There is no default value type for this property. The value type can be set to URI or TEXT. Other text-based value types can be used when defined in the future. Clients MUST ignore any properties with value types they do not understand.

Property Parameters:

IANA-registered, non-standard, id, alternate text representation, format type, derived and language property parameters can be specified on this property.

Conformance:

The property can be specified multiple times in the "VEVENT", "VTODO", "VJOURNAL", "VFREEBUSY", "PARTICIPANT", or "VALARM" calendar components.

If it does appear more than once there MUST be exactly one instance of the property with no DERIVED parameter or DERIVED=FALSE. All others MUST have DERIVED=TRUE.

Additionally, if there is one or more STYLED-DESCRIPTION property then the DESCRIPTION property should be either absent or have the parameter DERIVED=TRUE.

Description:

This property supports rich-text descriptions, for example HTML. Event publishers typically wish to provide more and better formatted information about the event.

This property is used in the "VEVENT" and "VTODO" to capture lengthy textual descriptions associated with the activity. This property is used in the "VJOURNAL" calendar component to capture one or more textual journal entries. This property is used in the "VALARM" calendar component to capture the display text for a DISPLAY category of alarm, and to capture the body text for an EMAIL category of alarm. In the PARTICIPANT component it provides a detailed description of the participant.

VALUE=TEXT is used to provide rich-text inline as the property value.

VALUE=URI is used to provide a link to rich-text content which is expected to be displayed inline as part of the event.

In either case the DESCRIPTION property should be absent or contain a plain text rendering of the styled text.

Applications MAY attempt to guess the media type of the resource via inspection of its content if and only if the media type of the resource is not given by the "FMTTYPE" parameter. If the media type remains unknown, calendar applications SHOULD treat it as type "text/html" and process the content as defined in [W3C.REC-html51-20171003]

Multiple STYLED-DESCRIPTION properties may be used to provide different formats or different language variants. However all but one MUST have DERIVED=TRUE.

Format Definition:

Example:

6.6. Structured-Data

This property is defined by the following notation:

```
sdataprop    = "STRUCTURED-DATA" sdataparam ":"
               sdataval CRLF

sdataparam     = ; all parameter elements may appear in any order,
               ; and the order is not significant.
               (sdataparamtext / sdataparambin / sdataparamuri)
               *(";" other-param)

sdataparamtext = ";VALUE=TEXT"
               ";" fmttypeparam
               ";" schemaparam

sdataparambin  = ";VALUE=BINARY"
               ";ENCODING=BASE64"
               ";" fmttypeparam
               ";" schemaparam
```

```
sdataparamuri  = ";VALUE=URI"
                [";" fmttypeparam]
                [";" schemaparam]

sdataval       = ( binary / text /uri )
                ; value MUST match value type
```

```
STRUCTURED-DATA;FMTTYPE=application/ld+json;
 SCHEMA="https://schema.org/SportsEvent";
 VALUE=TEXT:{\n
   "@context": "http://schema.org"\,\n
   "@type": "SportsEvent"\,\n
   "homeTeam": "Pittsburgh Pirates"\,\n
   "awayTeam": "San Francisco Giants"\n
 }\n
```

Property Name:

STRUCTURED-DATA

Purpose:

This property specifies ancillary data associated with the calendar component.

Value Type:

There is no default value type for this property. The value type can be set to TEXT, BINARY or URI

Property Parameters:

IANA-registered, non-standard, inline encoding and value data type property parameters can be specified on this property. The format type and schema parameters can be specified on this property and MUST be present for text or inline binary encoded content information.

Conformance:

This property can be specified multiple times in an iCalendar object. Typically it would be used in "VEVENT", "VTODO" or "VJOURNAL" calendar components.

Description:

The existing properties in iCalendar cover key elements of events and tasks such as start time, end time, location, summary, etc. However, different types of events often have other specific "fields" that it is useful to include in the calendar data. For example, an event representing an airline flight could include the airline, flight number, departure and arrival airport codes, check-in and gate-closing times etc. As another example, a sporting event might contain information about the type of sport, the home and away teams, the league the teams are in, information about nearby parking, etc.

This property is used to specify ancillary data in some structured format either directly (inline) as a "TEXT" or "BINARY" value or as a link via a "URI" value.

Rather than define new iCalendar properties for the variety of event types that might occur, it would be better to leverage existing schemas for such data. For example, schemas available at https://schema.org include different event types. By using standard schemas, interoperability can be improved between calendar clients and non-calendaring systems that wish to generate or process the data.

This property allows the direct inclusion of ancillary data whose schema is defined elsewhere. This property also includes parameters to clearly identify the type of the schema being used so that clients can quickly and easily spot what is relevant within the calendar data and present that to users or process it within the calendaring system.

iCalendar does support an "ATTACH" property which can be used to include documents or links to documents within the calendar data. However, that property does not allow data to be included as a "TEXT" value (a feature that "STRUCTURED-DATA" does allow), plus attachments are often treated

as "opaque" data to be processed by some other system rather than the calendar client. Thus the existing "ATTACH" property is not sufficient to cover the specific needs of inclusion of schema data. Extending the "ATTACH" property to support a new value type would likely cause interoperability problems. Additionally some implementations manage attachments by stripping them out and replacing with a link to the resource. Thus a new property to support inclusion of schema data is warranted.

Format Definition:

Example:

The following is an example of this property:

7. New Components

7.1. Participant

This component is defined by the following notation:

```
participantc = "BEGIN" ":" "PARTICIPANT" CRLF
               partprop *locationc *resourcec
               "END" ":" "PARTICIPANT" CRLF

partprop     = ; the elements herein may appear in any order,
               ; and the order is not significant.

               uid
               participanttype

               [calendaraddress]
               [created]
               [description]
               [dtstamp]
               [geo]
               [last-mod]
               [priority]
               [seq]
               [status]
               [summary]
               [url]

               *attach
               *categories
               *comment
               *contact
               *location
               *rstatus
               *related
               *resources
               *strucloc
               *strucres
               *styleddescription
               *sdataprop
               *iana-prop
```

The following is an example of this component. It contains a STRUCTURED-DATA property which points to a vCard providing information about the event participant.

```
BEGIN:PARTICIPANT
UID: em9lQGZvb2GFtcGxlLmNvbQ
PARTICIPANT-TYPE:PERFORMER
STRUCTURED-DATA;VALUE=URI:
 http://dir.example.com/vcard/aviolinist.vcf
END:PARTICIPANT
```

The following is an example for the primary contact.

```
BEGIN:PARTICIPANT
UID: em9lQGZvb2GFtcGxlLmNvbQ
STRUCTURED-DATA;VALUE=URI;
 http://dir.example.com/vcard/contacts/contact1.vcf
PARTICIPANT-TYPE:CONTACT
DESCRIPTION:A contact
END:PARTICIPANT
```

The following is an example for a participant with contact and location.

```
BEGIN:PARTICIPANT
UID: em9lQGZvb2GFtcGxlLmNdrt
STRUCTURED-DATA;VALUE=URI;
 http://dir.example.com/vcard/contacts/my-card.vcf
PARTICIPANT-TYPE:SPEAKER
DESCRIPTION:A participant
BEGIN:VLOCATION
UID:123456-abcdef-98765432
NAME:My home location
STRUCTURED-DATA;VALUE=URI:
http://dir.example.com/addresses/my-home.vcf
END:VLOCATION
END:PARTICIPANT
```

Component name:

PARTICIPANT

Purpose:

This component provides information about a participant in an event or task.

Conformance:

This component can be specified multiple times in a "VEVENT", "VTODO", "VJOURNAL" or "VFREEBUSY" calendar component.

Description:

This component provides information about a participant in a calendar component. A participant may be an attendee in a scheduling sense and the ATTENDEE property may be specified in addition. Participants can be individuals or organizations, for example a soccer team, the spectators or the musicians.

STRUCTURED-DATA properties if present may refer to definitions of the participant - such as a vCard.

The CALENDAR-ADDRESS property if present will provide a cal-address. If an ATTENDEE property has the same value the participant is considered schedulable. The PARTICIPANT component can be used to contain additional meta-data related to the attendee.

Format Definition:

Note:

When the PRIORITY is supplied it defines the ordering of PARTICIPANT components with the same value for the PARTICIPANT-TYPE property.

Privacy Issues:

When a LOCATION is supplied it provides information about the location of a participant at a given time or times. This may represent an unacceptable privacy risk for some participants. User agents MUST NOT broadcast this information without the participant's express permission. For further comments see Section 10

Example:

Example:

Example:

7.1.1. Schedulable Participant

A PARTICIPANT component may represent someone or something that needs to be scheduled as defined for ATTENDEE in [RFC5545] and [RFC5546]. The PARTICIPANT component may also represent someone or something that is NOT to receive scheduling messages.

For backwards compatibility wuth existing clients and servers when used to schedule events and tasks the ATTENDEE property MUST be used to specify the sheduling parameters as defined for that property.

For other, future uses the CALENDAR-ADDRESS property MUST be used to specify those parameters.

A PARTICIPANT component is defined to be schedulable if

- It contains a CALENDAR-ADDRESS property
- That property value is the same as the value for an ATTENDEE property.

If both of these conditions apply then the participant defined by the value of the URL property will take part in scheduling operations as defined in [RFC5546].

An appropriate use for the PARTICIPANT component in scheduling would be to store SEQUENCE and DTSTAMP properties associated with replies from each ATTENDEE. A LOCATION property within the PARTICIPANT component might allow better selection of meeting times when participants are in different timezones.

7.2. Location

This component is defined by the following notation:

```
locationc    = "BEGIN" ":" "VLOCATION" CRLF
               locprop
               "END" ":" "VLOCATION" CRLF

locprop      = ; the elements herein may appear in any order,
               ; and the order is not significant.

               uid

               [name]
```

```
                [description]
                [geo]
                [loctype]

                *sdataprop
                *iana-prop
```

The following is an example of this component. It points to a venue.

```
BEGIN:VLOCATION
UID:123456-abcdef-98765432
NAME:The venue
STRUCTURED-DATA;VALUE=URI:
 http://dir.example.com/venues/big-hall.vcf
END:VLOCATION
```

Component name:

VLOCATION

Purpose:

This component provides rich information about the location of an event using the structured data property or optionally a plain text typed value.

Conformance:

This component can be specified multiple times in a "VEVENT", "VTODO", "VJOURNAL", "VFREEBUSY" or "PARTICIPANT" calendar component.

Description:

There may be a number of locations associated with an event. This component provides detailed information about a location.

When used in a component the value of this property provides information about the event venue or of related services such as parking, dining, stations etc..

STRUCTURED-DATA properties if present may refer to representations of the location - such as a vCard.

Format Definition:

The NAME property is defined in [RFC7986]

Example:

7.3. Resource

This component is defined by the following notation:

```
resourcec     = "BEGIN" ":" "VRESOURCE" CRLF
                resprop
                "END" ":" "VRESOURCE" CRLF

resprop       = ; the elements herein may appear in any order,
                ; and the order is not significant.

                uid

                [name]
                [description]
```

```
[geo]
[restype]

*sdataprop
*iana-prop
```

The following is an example of this component. It refers to a projector.

```
BEGIN:VRESOURCE
UID:456789-abcdef-98765432
NAME:The projector
RESOURCE-TYPE:projector
STRUCTURED-DATA;VALUE=URI:http://dir.example.com/projectors/3d.vcf
END:VRESOURCE
```

Component name:

VRESOURCE

Purpose:

This component provides a typed reference to external information about a resource or optionally a plain text typed value. Typically a resource is anything that might be required or used by a calendar entity and possibly has a directory entry.

Conformance:

This component can be specified multiple times in a "VEVENT", "VTODO", "VJOURNAL", "VFREEBUSY" or "PARTICIPANT" calendar component.

Description:

When used in a component this component provides information about resources used for the event such as rooms, projectors, conferencing capabilities.

The RESOURCE-TYPE value registry provides a place in which resource types may be registered.

STRUCTURED-DATA properties if present may refer to representations of the resource - such as a vCard.

Format Definition:

The NAME property is defined in [RFC7986]

Example:

8. Extended examples

The following are some examples of the use of the properties defined in this specification. They include additional properties defined in [RFC7986] which includes IMAGE.

8.1. Example 1

The following is an example of a VEVENT describing a concert. It includes location information for the venue itself as well as references to parking and restaurants.

```
BEGIN:VEVENT
CREATED:20200215T145739Z
DESCRIPTION: Piano Sonata No 3\n
 Piano Sonata No 30
DTSTAMP:20200215T145739Z
DTSTART;TZID=America/New_York:20200315T150000Z
```

```
DTEND;TZID=America/New_York:20200315T163000Z
LAST-MODIFIED:20200216T145739Z
SUMMARY:Beethoven Piano Sonatas
UID:123456
IMAGE;VALUE=URI;DISPLAY=BADGE;FMTTYPE=image/png:h
 ttp://example.com/images/concert.png
BEGIN:PARTICIPANT
PARTICIPANT-TYPE:SPONSOR
UID:dG9tQGZvb2Jhci5xlLmNvbQ
STRUCTURED-DATA;VALUE=URI:http://example.com/sponsor.vcf
END:PARTICIPANT
BEGIN:PARTICIPANT
PARTICIPANT-TYPE:PERFORMER:
UID:em9lQGZvb2GFtcGxlLmNvbQ
STRUCTURED-DATA;VALUE=URI:http://www.example.com/people/johndoe.vcf
END:PARTICIPANT
BEGIN:VLOCATION
UID:123456-abcdef-98765432
NAME:The venue
STRUCTURED-DATA;VALUE=URI:http://dir.example.com/venues/big-hall.vcf
END:VLOCATION
BEGIN:VLOCATION
UID:123456-abcdef-87654321
NAME:Parking for the venue
STRUCTURED-DATA;VALUE=URI:http://dir.example.com/venues/parking.vcf
END:VLOCATION
END:VEVENT
```

8.2. Example 2

The following is an example of a VEVENT describing a meeting. One of the attendees is a remote participant.

```
BEGIN:VEVENT
CREATED:20200215T145739Z
DTSTAMP:20200215T145739Z
DTSTART;TZID=America/New_York:20200315T150000Z
DTEND;TZID=America/New_York:20200315T163000Z
LAST-MODIFIED:20200216T145739Z
SUMMARY:Conference planning
UID:123456
ORGANIZER:mailto:a@example.com
ATTENDEE;PARTSTAT=ACCEPTED;CN=A:mailto:a@example.com
ATTENDEE;RSVP=TRUE;CN=B:mailto:b@example.com
BEGIN:PARTICIPANT
PARTICIPANT-TYPE:ACTIVE:
UID:v39lQGZvb2GFtcGxlLmNvbQ
STRUCTURED-DATA;VALUE=URI:http://www.example.com/people/b.vcf
LOCATION:At home
END:PARTICIPANT
END:VEVENT
```

9. Security Considerations

This specification extends [RFC5545] and makes further use of possibly linked data. While calendar data is not unique in this regard it is worth reminding implementors of some of the dangers and safeguards.

9.1. URIs

See [RFC3986] for a discussion of the security considerations relating to URIs. Because of the issues discussed there and below, clients SHOULD NOT follow URIs and fetch content automatically, and should only do so at the explicit request of the user.

Fetching remote resources carries inherent risks. Connections must only be allowed on well known ports, using allowed protocols (generally just HTTP/HTTPS on their default ports). The URL must be resolved externally and not allowed to access internal resources. Connecting to an external source reveals IP (and therefore generally location) information.

A maliciously constructed iCalendar object may contain a very large number of URIs. In the case of published calendars with a large number of subscribers, such objects could be widely distributed. Implementations should be careful to limit the automatic fetching of linked resources to reduce the risk of this being an amplification vector for a denial-of-service attack.

9.2. Malicious Content

For the "STRUCTURED-DATA" property, agents need to be aware that a client could attack underlying storage by sending extremely large values and could attack processing time by uploading a recurring event with a large number of overrides and then repeatedly adding, updating and deleting structured data.

Agents should set reasonable limits on storage size and number of instances and apply those constraints. Calendar protocols should ensure there is a way to report on such limits being exceeded.

Malicious content could be introduced into the calendar server by way of the "STRUCTURED-DATA" property and propagated to many end users via scheduling. Servers SHOULD check this property for malicious or inappropriate content. Upon detecting such content, servers SHOULD remove the property,

9.3. HTML Content

When processing HTML content, applications need to be aware of the many security and privacy issues, as described in the IANA considerations section of [W3C.REC-html51-20171003]

10. Privacy Considerations

10.1. Tracking

Properties with a "URI" value type can expose their users to privacy leaks as any network access of the URI data can be tracked both by a network observer and by the entity hosting the remote resource. Clients SHOULD NOT automatically download data referenced by the URI without explicit instruction from users.

To help alleviate some of the concerns protocols and services could provide proxy services for downloading referenced data.

10.2. Revealing Locations

The addition of location information to the new participant component provides information about the location

of participants at a given time. This information MUST NOT be distributed to other participants without those participant's express permission. Note that there may be a number of participants who may be unaware of their inclusion in the data.

Agents processing and distributing calendar data must be aware that it has the property of providing information about a future time when a given individual may be at a particular location, which could enable targeted attacks against that individual.

The same may be true of other information contained in the participant component. In general, revealing only as much as is absolutely necessary should be the approach taken.

For example, there may be some privacy considerations relating to the ORDER parameter, as it provides an indication of the organizer's perception of the relative importance of other participants.

11. IANA Considerations

11.1. Additional iCalendar Registrations

11.1.1. Properties

This document defines the following new iCalendar properties to be added to the registry defined in Section 8.2.3 of [RFC5545]:

Property	Status	Reference
CALENDAR-ADDRESS	Current	RFCXXXX, Section 6.4
LOCATION-TYPE	Current	RFCXXXX, Section 6.1
PARTICIPANT-TYPE	Current	RFCXXXX, Section 6.2
RESOURCE-TYPE	Current	RFCXXXX, Section 6.3
STRUCTURED-DATA	Current	RFCXXXX, Section 6.6
STYLED-DESCRIPTION	Current	RFCXXXX, Section 6.5

11.1.2. Parameters

This document defines the following new iCalendar property parameters to be added to the registry defined in Section 8.2.4 of [RFC5545]:

Property Parameter	Status	Reference
ORDER	Current	RFCXXXX, Section 5.1
SCHEMA	Current	RFCXXXX, Section 5.2

11.1.3. Components

This document defines the following new iCalendar components to be added to the registry defined in Section 8.3.1 of [RFC5545]:

Component	Status	Reference
PARTICIPANT	Current	RFCXXXX, Section 7.1
VLOCATION	Current	RFCXXXX, Section 7.2
VRESOURCE	Current	RFCXXXX, Section 7.3

11.2. New Registration Tables

This section defines new registration tables for PARTICIPANT-TYPE and RESOURCE-TYPE values. These tables are updated using the same approaches laid down in Section 8.2.1 of [RFC5545]

This document creates new IANA registries for participant and resource types. IANA will maintain these registries and, following the policies outlined in [RFC8126], new tokens are assigned after Expert Review. The Expert Reviewer will generally consult the IETF GeoPRIV working group mailing list or its designated successor. Updates or deletions of tokens from the registration follow the same procedures. The expert review should be guided by a few common sense considerations. For example, tokens should not be specific to a country, region, organization, or company; they should be well- defined and widely recognized. The expert's support of IANA will include providing IANA with the new token(s) when the update is provided only in the form of a schema, and providing IANA with the new schema element(s) when the update is provided only in the form of a token. To ensure widespread usability across protocols, tokens MUST follow the character set restrictions for XML Names [3]. Each registration must include the name of the token and a brief description similar to the ones offered herein for the initial registrations contained this document:

11.2.1. Participant Types

The following table has been used to initialize the participant types registry.

Participant Type	Status	Reference
ACTIVE	Current	RFCXXXX, Section 6.2
INACTIVE	Current	RFCXXXX, Section 6.2
SPONSOR	Current	RFCXXXX, Section 6.2
CONTACT	Current	RFCXXXX, Section 6.2
BOOKING-CONTACT	Current	RFCXXXX, Section 6.2
EMERGENCY-CONTACT	Current	RFCXXXX, Section 6.2
PUBLICITY-CONTACT	Current	RFCXXXX, Section 6.2
PLANNER-CONTACT	Current	RFCXXXX, Section 6.2
PERFORMER	Current	RFCXXXX, Section 6.2
SPEAKER	Current	RFCXXXX, Section 6.2

11.2.2. Resource Types

The following table has been used to initialize the resource types registry.

Resource Type	Status	Reference
PROJECTOR	Current	RFCXXXX, Section 6.3
ROOM	Current	RFCXXXX, Section 6.3
REMOTE-CONFERENCE-AUDIO	Current	RFCXXXX, Section 6.3
REMOTE-CONFERENCE-VIDEO	Current	RFCXXXX, Section 6.3

12. Acknowledgements

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13. Normative References

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Appendix A. Open issues

None at the moment

Appendix B. Change log

To be deleted on publication

calext-v18 2021-??-?? MD

- Fix incorrect participant type property name in PARTICIPANT.
- Allow parameters on LOCATION-TYPE.

calext-v17 2021-01-03 MD

- Remove STRUCTURED-LOCATION property, add VLOCATION component.
- Remove STRUCTURED-RESOURCE property, add VRESOURCE component.
- Make LOCATION-TYPE multi-valued property for location.
- Make RESOURCE-TYPE multi-valued property for resource.
- Tidy up abnf.

calext-v16 2019-10-09 MD

- Make LOCTYPE multi-valued.
- Add all ATTENDEE scheduling parameters to CALENDAR-ADDRESS.

calext-v15 2019-10-08 MD

- Address various DICUSS points.

calext-v14 2019-06-11 MD

- Definition of event and social calendaring.
- Remove redefinition of SOURCE - use STRUCTURED-DATA.

calext-v13 2019-05-26 MD

- Respond to various issues.

calext-v12 2019-02-28 MD

- Fix styled-description example. Respond to various AD issues. Some typos.

calext-v11 2019-02-27 MD

- Add DERIVED parameter for styled-description, RELATED parameter for structured-location

calext-v09 2018-08-30 MD

- Sorted out inconsistencies in refs to 5546

calext-v08 2018-07-06 MD

- Add some text for equal ORDER values
- Switched scheduleaddress to calendaraddress in participant abnf. Also added more properties
- Fixed PARTICIPANT abnf

calext-v04 2017-10-11 MD

- Change SCHEDULE-ADDRESS to CALENDAR-ADDRESS
- Explicitly broaden scope of SOURCE
- Add initial registry for RESTYPE and move new tables into separate section.
- Fix PARTTYPE/PARTICIPANT-TYPE inconsistency

calext-v03 2017-10-09 MD

- Mostly typographical and other minor changes

calext-v02 2017-04-20 MD

- Add SCHEDULE-ADDRESS property
- PARTICIPANT becomes a component rather than a property. Turn many of the former parameters into properties.
- Use existing ATTENDEE property for scheduling.

calext-v01 2017-02-18 MD

- Change ASSOCIATE back to PARTICIPANT
- PARTICIPANT becomes a component rather than a property. Turn many of the former parameters into properties.

calext-v00 2016-08-?? MD

- Name changed - taken up by calext working group

v06 2016-06-26 MD

- Fix up abnf
- change ref to ietf from daboo
- take out label spec - use Cyrus spec

v05 2016-06-14 MD

- Remove GROUP and HASH. they can be dealt with elsewhere if desired
- Change ORDER to integer >= 1.
- Incorporate Structured-Data into this specification.

v04 2014-02-01 MD

- Added updates attribute.
- Minor typos.
- Resubmitted mostly to refresh the draft.

v03 2013-03-06 MD

- Replace PARTICIPANT with ASSOCIATE plus related changes.
- Added section showing modifications to components.
- Replace ID with GROUP and modify HASH.
- Replace TITLE param with LABEL.
- Fixed STYLED-DESCRIPTION in various ways, correct example.

v02 2012-11-02 MD

- Collapse sections with description of properties and the use cases into a section with sub-sections.
- New section to describe relating properties.
- Remove idref and upgrade hash to have the reference
- No default value types on properties..

v01 2012-10-18 MD Many changes.

- SPONSOR and STRUCTURED-CONTACT are now in PARTICIPANT
- Add a STRUCTURED-RESOURCE property
- STYLED-DESCRIPTION to handle rich text
- Much more...

2011-01-07

- Remove MEDIA - it's going in the Cyrus RFC
- Rename EXTENDED-... to STRUCTURED-...
- Add TYPE parameter to SPONSOR

v00 2007-10-19 MD Initial version

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