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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.

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Table of Contents

1.	Introduction	3
1.1.	Conventions Used in This Document	3
2.	Components and properties	3
3.	Typed References	4
3.1.	Use Cases	5
3.1.1.	Piano Concert Performance	5
3.1.2.	Itineraries	5
3.1.2.1.	Reserving facilities	5
4.	Modifications to Calendar Components	6
5.	New Property Parameters	7
5.1.	Loctype	7
5.2.	Restype	7
5.3.	Order	8
5.4.	Schema	9
5.5.	Derived	9
6.	Redefined Property SOURCE	10
7.	New Properties	12
7.1.	Participant Type	12
7.2.	Calendar Address	14
7.3.	Styled-Description	15
7.4.	Structured-Location	17
7.5.	Structured-Resource	19
7.6.	Structured-Data	20
8.	New Components	23
8.1.	Participant	23
8.2.	Schedulable Participant	25
9.	Extended examples	26
9.1.	Example 1	26
9.2.	Example 2	26
10.	Security Considerations	27
11.	Privacy Considerations	27
12.	IANA Considerations	28
12.1.	Additional iCalendar Registrations	28
12.1.1.	Properties	28
12.1.2.	Parameters	28
12.1.3.	Components	28
12.2.	New Registration Tables	29
12.2.1.	Participant Types	29
12.2.2.	Resource Types	29
13.	Acknowledgements	29
14.	References	30
14.1.	Normative References	30

Douglass

Expires November 27, 2019

[Page 2]

14.2.	Informative References	31
Appendix A.	Open issues	31
Appendix B.	Change log	31
Author's Address	34

[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 a component 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.

[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 PARTICIPANT as a component rather than a property. 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 component and resolves some of the problems of trying to add detailed information as a parameter.

Many people or groups may participate in an event. The PARTICIPANT component provides such detailed information. Participants may act as attendees to the event (or derived events) or may just provide a reference - perhaps for mailing lists.

3. Typed References

The properties defined here can all reference external meta-data which may be used by applications to provide enhanced value to users. By providing type information as parameters, 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.

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 STRUCTURED-LOCATION, information about a number of interesting locations can be communicated, for example, address, region, country, postal code as well as other informations such as the parking, 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 supplied properties looking for those of particular interest. The TYPE and FMTTYPE parameters, 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 also be used to provide useful extra data about an attendee. For example a LOCATION property inside the

PARTICIPANT gives the actual location of a remote attendee. (But see the note about privacy.)

3.1. Use Cases

The main motivation for these properties 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 will 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 traveller 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 10 attendees non of which are co-located. The current ATTENDEE property does not allow for the addition of such

meta-data. The PARTICIPANT property allows attendees to specify their location.

4. Modifications to Calendar Components

The following changes to the syntax defined in iCalendar [[RFC5545](#)] are made here. New elements are defined in subsequent sections.

```
eventc      = "BEGIN" ":" "VEVENT" CRLF
              eventprop *alarmc *participantc
              "END" ":" "VEVENT" CRLF
```

```
eventprop =/ *(
              ;
              ; The following are OPTIONAL,
              ; and MAY occur more than once.
              ;
              styleddescription / strucloc / strucres / sdataprop
              ;
              )
```

```
todoc      = "BEGIN" ":" "VTODO" CRLF
              todoprop *alarmc *participantc
              "END" ":" "VTODO" CRLF
```

```
todoprop =/ *(
              ;
              ; The following are OPTIONAL,
              ; and MAY occur more than once.
              ;
              styleddescription / strucloc / strucres / sdataprop
              ;
              )
```

```
journalc   = "BEGIN" ":" "VJOURNAL" CRLF
              jourprop *participantc
              "END" ":" "VJOURNAL" CRLF
```

```
jourprop =/ *(
              ;
              ; The following are OPTIONAL,
              ; and MAY occur more than once.
              ;
              styleddescription / sdataprop
              ;
              )
```



```
freebusyc = "BEGIN" ":" "VFREEBUSY" CRLF
           fbprop *participantc
           "END" ":" "VFREEBUSY" CRLF

fbprop    =/ *(
           ;
           ; The following are OPTIONAL,
           ; and MAY occur more than once.
           ;
           styleddescription
           ;
           )
```

5. New Property Parameters

This specification makes use of the LABEL parameter which is defined in [[RFC7986](#)]

5.1. Loctype

Parameter name: LOCTYPE

Purpose: To specify the type of location.

Format Definition:

This parameter is defined by the following notation:

```
loctypeparam = "LOCTYPE" "=" param-value
```

Description: This parameter MAY be specified on STRUCTURED-LOCATION and provides a way to differentiate multiple properties. For example, it allows event producers to provide location information for the venue and the parking.

Values for this parameter are taken from the values defined in [[RFC4589](#)]. New location types SHOULD be registered in the manner laid down in that specification.

5.2. Restype

Parameter name: RESTYPE

Purpose: To specify the type of resource.

Format Definition:

This parameter is defined by the following notation:

```
restypeparam = "RESTYPE" "=" restypevalue CRLF

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

Description: This parameter MAY be specified on STRUCTURED-RESOURCE and provides a way to differentiate multiple properties.

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.

5.3. Order

Parameter name: ORDER

Purpose: To define ordering for the associated property.

Format Definition:

This parameter is defined by the following notation:

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

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 at the lowest level of ordering, 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.

5.4. Schema

Parameter Name: SCHEMA

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

Format Definition:

This parameter is defined by the following notation:

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

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 "FMPTYPE" parameter on the corresponding property.

Example:

```
STRUCTURED-DATA;FMPTYPE=application/ld+json;  
  SCHEMA="https://schema.org/FlightReservation";  
  ENCODING=BASE64;VALUE=BINARY:Zm9vYmFy
```

5.5. Derived

Parameter Name: DERIVED

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

Format Definition:

This parameter is defined by the following notation:

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

Description: This property parameter can 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:

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

6. Redefined Property SOURCE

The SOURCE property defined in [[RFC7986](#)] is redefined to allow VALUE=TEXT and broaden its usage to any component.

Property name: SOURCE

Purpose: This property provides a reference to information about a component such as a participant. For example, that information may be a vcard or a plain text typed value.

For value type URI and embedded in a VEVENT or VTODO it may provide a location from which the component may be refreshed.

Value type: There is no default value type for this property. It may be set to URI as in [[RFC7986](#)]. The value type can also be set to TEXT to indicate plain text content.

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

Conformance: This property can be specified once in an iCalendar object.

Description: This property provides information about the component in which it appears.

In a PARTICIPANT component it may provide a reference to a vcard giving directory information.

In a VCALENDAR component this property identifies a location where a client can retrieve updated data for the calendar. Clients SHOULD honor any specified "REFRESH-INTERVAL" value when periodically retrieving data. Note that this property differs from the "URL" property in that "URL" is meant to provide an alternative representation of the calendar data rather than the original location of the data.

In a calendar entity component such as an event the SOURCE property may provide a reference to the original source of the event. This may be used by aggregators to provide a link back.

Format Definition:

This property is defined by the following notation:

```
source      = "SOURCE" sourceparam
              (
                (
                  ";" "VALUE" "=" "URI"
                  ":" uri
                ) /
                (
                  ";" "VALUE" "=" "TEXT"
                  ":" text
                )
              )
              CRLF

sourceparam  = *(
              ;
              ; the following are OPTIONAL
              ; but MUST NOT occur more than once
              ;
              (";" fmttypeparam) /
              ;
              ; the following is OPTIONAL
              ; and MAY occur more than once
              ;
              (";" other-param)
              ;
              )
```

Example:

The following is an example referring to a VCARD.

```
SOURCE;FMTTYPE=text/vcard;VALUE=URL:
http://dir.example.com/vcard/contacts/contact1.vcf
```

7. New Properties

7.1. Participant Type

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:

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  = *(
                  ; the following is OPTIONAL
                  ; and MAY occur more than once
                  ;
                  (";" other-param)
                  )
```

Example:

The following is an example of this property:

```
PARTICIPANT-TYPE:SPEAKER
```

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 part - 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

7.2. Calendar Address

Property name: CALENDAR-ADDRESS

Purpose: To specify the calendar address for a participant.

Value type: CAL-ADDRESS

Property Parameters: IANA 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:

This property is defined by the following notation:

```
calendaraddress = "CALENDAR-ADDRESS" caladdressparam ":"  
                  cal-address CRLF  
  
caladdressparam = *(  
                  ; the following is OPTIONAL  
                  ; and MAY occur more than once  
                  ;  
                  (";" other-param)  
                  )
```


7.3. Styled-Description

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, 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:

This property is defined by the following notation:

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

```
styleddescparam   = *(
    ; The following is REQUIRED,
    ; but MUST NOT occur more than once.
    ;
    (";" "VALUE" "=" ("URI" / "TEXT")) /
    ;
    ; The following are OPTIONAL,
    ; but MUST NOT occur more than once.
    ;
    (";" altrepparam) / (";" languageparam) /
    (";" fmttypeparam) / (";" derivedparam) /
    ;
    ; the following is OPTIONAL
    ; and MAY occur more than once
    ;
    (";" other-param)
  )
```

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

Example:

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

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

7.4. Structured-Location

Property name: STRUCTURED-LOCATION

Purpose: This property provides a typed reference to external information about the location of an event or optionally a plain text typed value.

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

Property Parameters: IANA, non-standard, label, loctype, related or format type parameters can be specified on this property.

Conformance: This property MAY be specified zero or more times in any iCalendar component.

Description: There may be a number of locations associated with an event. This provides detailed information about these locations.

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..

When a LABEL parameter is supplied the language of the label SHOULD match that of the content and of the LANGUAGE parameter if present.

Use of the related parameter: This allows a location to define the start and/or end timezone of the associated component. If a location is specified with a RELATED parameter then the affected DTSTART or DTEND properties MUST be specified as floating DATE-TIME value.

If the RELATED parameter is present with a value of START, then the "DTSTART" property MUST be present in the associated "VEVENT" or "VTODO" calendar component.

For an event, if the RELATED parameter is present with a value of END, then the "DTEND" property or the "DTSTART" and "DURATION" properties MUST be present in the associated "VEVENT" calendar component.

For a to-do with a RELATED value of END, then either the "DUE" property or the "DTSTART" and "DURATION" properties MUST be present in the associated "VTODO" calendar component.

If there is a location specified with RELATED=START and no location is specified with RELATED=END then the event is assumed to start and end in the same timezone.

Format Definition:

This property is defined by the following notation:

```

strucloc      = "STRUCTURED-LOCATION" struclocparam ":"
                struclocval CRLF

struclocparam = *(
    ; The following is REQUIRED,
    ; but MUST NOT occur more than once.
    ;
    (";" "VALUE" "=" ("URI" / "TEXT")) /
    ;
    ; the following are OPTIONAL
    ; but MUST NOT occur more than once
    ;
    (";" fmttypeparam) /
    (";" labelparam) /
    (";" languageparam) /
    (";" trigrelparam) /
    (";" loctypeparam) /
    ;
    ; the following is OPTIONAL
    ; and MAY occur more than once
    ;
    (";" other-param)
)

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

```

Example:

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

```

STRUCTURED-LOCATION;LABEL="The venue";
VALUE=URI:
http://dir.example.com/venues/big-hall.vcf

```


7.5. Structured-Resource

Property name: STRUCTURED-RESOURCE

Purpose: This property 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.

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

Property Parameters: IANA, non-standard, label, restype or format type parameters can be specified on this property.

Conformance: The property can be specified multiple times in the "VEVENT" or "VTODO" calendar components.

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

Such resources may be a room or a projector. This RESTYPE value registry provides a place in which resource types may be registered for use by scheduling services.

When a LABEL parameter is supplied the language of the label must match that of the content and of the LANGUAGE parameter if present.

Format Definition:

This property is defined by the following notation:

```

strucres      = "STRUCTURED-RESOURCE" strucresparam ":"
                strucresval CRLF

strucresparam = *(
    ; The following is REQUIRED,
    ; but MUST NOT occur more than once.
    ;
    (";" "VALUE" "=" ("URI" / "TEXT")) /
    ;
    ; the following are OPTIONAL
    ; but MUST NOT occur more than once
    ;
    (";" fmttypeparam) /
    (";" labelparam) /
    (";" languageparam) /
    (";" restypeparam) /
    ;
    ; the following is OPTIONAL
    ; and MAY occur more than once
    ;
    (";" other-param)
)

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

```

Example:

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

```

STRUCTURED-RESOURCE;value=uri;restype="projector":
http://dir.example.com/projectors/3d.vcf

```

7.6. Structured-Data

Property Name: STRUCTURED-DATA

Purpose: This property specifies ancillary data associated with the calendar component.

Value Type: TEXT, BINARY or URI

Property Parameters: IANA, 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 are RECOMMENDED 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. Thus a new property to support inclusion of schema data is warranted.

Format Definition:

This property is defined by the following notation:

```
sdataprop  = "STRUCTURED-DATA" sdataparam
              (":" text) /
              (
                ";" "ENCODING" "=" "BASE64"
                ";" "VALUE" "=" "BINARY"
                ":" binary
              ) /
              (
                ";" "VALUE" "=" "URI"
                ":" uri
              )
              CRLF

sdataparam  = *(
              ;
              ; The following is OPTIONAL for a URI value,
              ; RECOMMENDED for a TEXT or BINARY value,
              ; and MUST NOT occur more than once.
              ;
              (":" fmttypeparam) /
              (":" schemaparam) /
              ;
              ; The following is OPTIONAL,
              ; and MAY occur more than once.
              ;
              (":" other-param)
              ;
            )
```

Example: The following is an example of this property:

```
STRUCTURED-DATA;FMPTYPE=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
```


8. New Components

8.1. 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 an event, task or poll. A participant may be an attendee in a scheduling sense and the ATTENDEE property may be specified in addition. Participants in events can be individuals or organizations, for example a soccer team, the spectators, or the musicians.

The SOURCE property if present may refer to an external definition 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:

This component is defined by the following notation:

```
participantc = "BEGIN" ":" "PARTICIPANT" CRLF
              partprop
              "END" ":" "PARTICIPANT" CRLF

partprop      = *(
              ;
              ; The following are REQUIRED,
              ; but MUST NOT occur more than once.
              ;
              dtstamp / participanttype / uid /
              ;
              ; The following are OPTIONAL,
              ; but MUST NOT occur more than once.
              ;
              created / description / geo / last-mod / priority / seq /
              source / status / calendaraddress / summary / url /
              ;
              ; The following are OPTIONAL,
              ; and MAY occur more than once.
              ;
              attach / categories / comment /
              contact / location / rstatus / related /
              resources / strucloc / strucres / styleddescription /
              iana-prop
              ;
              )
```

Note: When the PRIORITY is supplied it defines the ordering of PARTICIPANT components with the same value for the TYPE parameter.

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 include this information without informing the participant.

Example:

The following is an example of this component. It contains a SOURCE property which points to a VCARD providing information about the event participant.

```
BEGIN:PARTICIPANT
PARTICIPANT-TYPE:PERFORMER
SOURCE:http://dir.example.com/vcard/aviolinist.vcf
END:PARTICIPANT
```

Example:

The following is an example for the primary contact.

```
BEGIN: PARTICIPANT
SOURCE;FMTTYPE=text/vcard;
  http://dir.example.com/vcard/contacts/contact1.vcf
PARTICIPANT-TYPE:CONTACT
DESCRIPTION:A contact:
END:PARTICIPANT
```

8.2. 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.

A PARTICIPANT component is defined to be schedulable if

- o It contains a CALENDAR-ADDRESS property
- o 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.

9. 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.

9.1. 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:20170216T145739Z
DESCRIPTION: Piano Sonata No 3\n
    Piano Sonata No 30
DTSTAMP:20171116T145739Z
DTSTART;TZID=America/New_York:20170315T150000Z
DTEND;TZID=America/New_York:20170315T163000Z
LAST-MODIFIED:20170216T145739Z
SUMMARY:Beethoven Piano Sonatas
UID:123456
STRUCTURED-LOCATION;LABEL="The venue";VALUE=URI:
    http://dir.example.com/venues/big-hall.vcf
STRUCTURED-LOCATION;LABEL="Parking for the venue";VALUE=URI:
    http://dir.example.com/venues/parking.vcf
IMAGE;VALUE=URI;DISPLAY=BADGE;FMTPRINT=jpeg;FMTTYPE=image/png;h
    ttp://example.com/images/concert.png
BEGIN:PARTICIPANT
PARTICIPANT-TYPE:SPONSOR
SOURCE:http://example.com/sponsor.vcf
END:PARTICIPANT
BEGIN:PARTICIPANT
PARTICIPANT-TYPE:PERFORMER:
SOURCE:http://www.example.com/people/johndoe.vcf
END:PARTICIPANT
END:VEVENT
```

9.2. Example 2

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

```
BEGIN:VEVENT
CREATED:20170216T145739Z
DTSTAMP:20101116T145739Z
DTSTART;TZID=America/New_York:20170315T150000Z
DTEND;TZID=America/New_York:20170315T163000Z
LAST-MODIFIED:20170216T145739Z
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:
SOURCE:http://www.example.com/people/b.vcf
LOCATION:At home
END:PARTICIPANT
END:VEVENT
```

10. Security Considerations

Applications using these properties 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.

Security considerations relating to the "ATTACH" property, as described in [[RFC5545](#)], are applicable to the "STRUCTURED-DATA" property.

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](#)]

11. Privacy Considerations

Properties with a "URI" value type can expose their users to privacy leaks as any network access of the URI data can be tracked. Clients SHOULD NOT automatically download data referenced by the URI without explicit instruction from users. This specification does not introduce any additional privacy concerns beyond those described in [[RFC5545](#)].

The addition of location information to the new participant component provides information about the location of participants at a given time.

[12.](#) IANA Considerations

[12.1.](#) Additional iCalendar Registrations

[12.1.1.](#) 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 7.2
PARTICIPANT-TYPE	Current	RFCXXXX, Section 7.1
SOURCE	Current	RFCXXXX, Section 6
STRUCTURED-DATA	Current	RFCXXXX, Section 7.6
STYLED-DESCRIPTION	Current	RFCXXXX, Section 7.3
STRUCTURED-LOCATION	Current	RFCXXXX, Section 7.4
STRUCTURED-RESOURCE	Current	RFCXXXX, Section 7.5

[12.1.2.](#) 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
LOCTYPE	Current	RFCXXXX, Section 5.1
ORDER	Current	RFCXXXX, Section 5.3
RESTYPE	Current	RFCXXXX, Section 5.2
SCHEMA	Current	RFCXXXX, Section 5.4

[12.1.3.](#) 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 8.1

12.2. New Registration Tables

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

12.2.1. Participant Types

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

Participant Type	Status	Reference
ACTIVE	Current	RFCXXXX, Section 7.1
INACTIVE	Current	RFCXXXX, Section 7.1
SPONSOR	Current	RFCXXXX, Section 7.1
CONTACT	Current	RFCXXXX, Section 7.1
BOOKING-CONTACT	Current	RFCXXXX, Section 7.1
EMERGENCY-CONTACT	Current	RFCXXXX, Section 7.1
PUBLICITY-CONTACT	Current	RFCXXXX, Section 7.1
PLANNER-CONTACT	Current	RFCXXXX, Section 7.1
PERFORMER	Current	RFCXXXX, Section 7.1
SPEAKER	Current	RFCXXXX, Section 7.1

12.2.2. Resource Types

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

Resource Type	Status	Reference
PROJECTOR	Current	RFCXXXX, Section 5.2
ROOM	Current	RFCXXXX, Section 5.2
REMOTE-CONFERENCE-AUDIO	Current	RFCXXXX, Section 5.2
REMOTE-CONFERENCE-VIDEO	Current	RFCXXXX, Section 5.2

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14. References

14.1. Normative References

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[14.2. Informative References](#)

[iana-property-registry] "IANA iCalendar Element Registries", <<https://www.iana.org/assignments/icalendar/icalendar.xhtml>>.

[Appendix A. Open issues](#)

None at the moment

[Appendix B. Change log](#)

calext-v13 2019-05-26 MD

- o Respond to various issues.

calext-v12 2019-02-28 MD

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

calext-v11 2019-02-27 MD

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

calext-v09 2018-08-30 MD

- o Sorted out inconsistencies in refs to 5546

calext-v08 2018-07-06 MD

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

calext-v04 2017-10-11 MD

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

calext-v03 2017-10-09 MD

- o Mostly typographical and other minor changes

calext-v02 2017-04-20 MD

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

calext-v01 2017-02-18 MD

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

calext-v00 2016-08-?? MD

- o Name changed - taken up by calext working group

v06 2016-06-26 MD

- o Fix up abnf

- o change ref to ietf from daboo
- o take out label spec - use Cyrus spec

v05 2016-06-14 MD

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

v04 2014-02-01 MD

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

v03 2013-03-06 MD

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

v02 2012-11-02 MD

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

v01 2012-10-18 MD Many changes.

- o SPONSOR and STRUCTURED-CONTACT are now in PARTICIPANT
- o Add a STRUCTURED-RESOURCE property

- o STYLED-DESCRIPTION to handle rich text
- o Much more...

2011-01-07

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

v00 2007-10-19 MD Initial version

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