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A. Melnikov
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iCalendar Message-Based Interoperability Protocol (iMIP)

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Abstract

This document, iCalendar Message-Based Interoperability Protocol (iMIP), specifies a binding from the iCalendar Transport-independent Interoperability Protocol (iTIP) to Internet email-based transports.

Calendaring entries defined by the iCalendar Object Model (iCAL) are composed using constructs from [RFC 2822](#), [RFC 2045](#), [RFC 2046](#), [RFC 2047](#) and [RFC 2049](#).

This document is a product of Calendaring and Scheduling Standards Simplification (calsify) working group. More information about the IETF CALSIFY working group activities can be found on the IETF web site at <<http://www.ietf.org/html.charters/calsify-charter.html>>.

The issue tracker for the Calsify WG is located at:
<<http://www.ofcourseimright.com/cgi-bin/roundup/calsify>>

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1	Introduction	

This binding document provides the transport specific information necessary to convey iCalendar Transport-independent Interoperability Protocol (iTIP) [[iTIP](#)] over MIME as defined in [[RFC-2822](#)] and [[RFC-2045](#)].

[1.1](#) Related Memos

Implementers will need to be familiar with several other memos that, along with this memo, form a framework for Internet calendaring and scheduling standards.

This document, [iMIP], specifies an Internet email binding for iTIP.

[iCAL] - specifies a core specification of objects, data types, properties and property parameters;

[iTIP] - specifies an interoperability protocol for scheduling between different implementations;

This memo does not attempt to repeat the specification of concepts or definitions from these other memos. Where possible, references are made to the memo that provides for the specification of these concepts or definitions.

1.2 Formatting Conventions

The mechanisms defined in this memo are defined in prose. In order to refer to elements of the calendaring and scheduling model, core object or interoperability protocol defined in [[iCAL](#)] and [[iTIP](#)] some formatting conventions have been used.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [[RFC-2119](#)].

Calendaring and scheduling roles are referred to in quoted-strings of text with the first character of each word in upper case. For example, "Organizer" refers to a role of a "Calendar User" within the scheduling protocol defined by [[iTIP](#)].

Calendar components defined by [[iCAL](#)] are referred to with capitalized, quoted-strings of text. All calendar components start with the letter "V". For example, "VEVENT" refers to the event calendar component, "VTODO" refers to the to-do calendar component and "VJOURNAL" refers to the daily journal calendar component.

Scheduling methods defined by [[iTIP](#)] are referred to with capitalized, quoted-strings of text. For example, "REQUEST" refers to the method for requesting a scheduling calendar component be created or modified, "REPLY" refers to the method a recipient of a request uses to update their status with the "Organizer" of the calendar component.

Properties defined by [[iCAL](#)] are referred to with capitalized, quoted-strings of text, followed by the word "property". For example, "ATTENDEE" property refers to the iCalendar property used to convey the calendar address of a calendar user.

Property parameters defined by [[iCAL](#)] are referred to with lower case, quoted-strings of text, followed by the word "parameter". For example, "value" parameter refers to the iCalendar property parameter used to override the default data type for a property value.

1.3 Terminology

The email terms used in this memo are defined in [[RFC-2822](#)] and [[RFC-2045](#)]. The calendaring and scheduling terms used in this memo are defined in [[iCAL](#)] and [[iTIP](#)].

2 MIME Message Format Binding

This section defines the message binding to the MIME electronic mail transport.

The sections below refer to the "originator" and the "respondent" of an iMIP message. Typically, the originator is the "Organizer" of an event. The respondent is an "Attendee" of the event.

The [[RFC-2822](#)] "Reply-To" header typically contains the email address of the originator or respondent of an event. However, this cannot be guaranteed as Mail User Agents (MUA) are not required to enforce iMIP semantics.

2.1 MIME Media Type

A MIME entity containing content information formatted according to this document will be referenced as a "text/calendar" content type. It is assumed that this content type will be transported through a MIME electronic mail transport.

2.2 Security

This section addresses several aspects of security including Authentication, Authorization and Confidentiality. Authentication and confidentiality can be achieved using [[RFC-1847](#)] that specifies the Security Multiparts for MIME. This framework defines new content types and subtypes of multipart: signed and encrypted. Each contains two body parts: one for the protected data and another for the control information necessary to remove the protection.

2.2.1 Authorization

In [[iTIP](#)] messages, only the "Organizer" is authorized to modify or cancel calendar entries they organize. That is, spoof@xyz.example.net is not allowed to modify or cancel a meeting that was organized by a@example.com. Furthermore, only the respondent has the authorization to indicate their status to the "Organizer". That is, the "Organizer" must ignore an [[iTIP](#)] message from spoof@xyz.example.net that declines a meeting invitation for b@example.com.

Implementations of iMIP SHOULD verify the authenticity of the creator of an iCalendar object before taking any action. The methods for doing this are presented later in this document.

[RFC-1847] Message flow in iTIP supports someone working on behalf of a "Calendar User" through use of the "sent-by" parameter that is associated with the "ATTENDEE" and "ORGANIZER" properties. However, there is no mechanism to verify whether or not a "Calendar User" has authorized someone to work on their behalf. It is left to implementations to provide mechanisms for the "Calendar Users" to make that decision.

2.2.2 Authentication

Authentication can be performed using an implementation of [RFC-1847] "multipart/signed" that supports public/private key certificates. Authentication is possible only on messages that have been signed. Authenticating an unsigned message may not be reliable.

2.2.3 Confidentiality

To ensure confidentiality using iMIP implementations should utilize encryption compliant with [RFC-1847]. The protocol does not restrict a "Calendar User Agent" (CUA) from forwarding iCalendar objects to other users or agents.

2.3 [RFC-2822] Addresses

The calendar address specified within the "ATTENDEE" property in an iCalendar object MUST be a fully qualified, [RFC-2822] address specification for the corresponding "Organizer" or "Attendee" of the "VEVENT" or "VTODO".

Because [iTIP] does not preclude "Attendees" from forwarding "VEVENTS" or "VTODOS" to others, the [RFC-2822] "Sender" value may not equal that of the "Organizer". Additionally, the "Organizer" or "Attendee" cannot be reliably inferred by the [RFC-2822] "Sender" or "Reply-to" values of an iMIP message. The relevant address MUST be ascertained by opening the "text/calendar" MIME body part and examining the "ATTENDEE" and "ORGANIZER" properties.

2.4 Content Type

A MIME body part containing content information that conforms to this document MUST have an [RFC-2045] "Content-Type" value of "text/calendar". The [RFC-2045] "Content-Type" header field MUST also include the type parameter "method". The value MUST be the same as the value of the "METHOD" calendar property within the iCalendar

object.

Note 1: A MIME message containing multiple iCalendar objects with different method values must be further encapsulated with a "multipart/mixed" MIME entity. This will allow each of the iCalendar objects to be encapsulated within their own "text/calendar" MIME entity.

Note 2: A MIME body part of "text/calendar" "Content-Type" that lacks the "method" parameter is not considered to be an iMIP body part and thus is not subject to the requirements specified in this document.

Note that according to [[iCAL](#)] the default character set for iCalendar objects is UTF-8 [[UTF-8](#)]. However the default character set for a "text/*" MIME entity [[RFC-2046](#)] is US-ASCII. Thus a "charset" parameter MUST be present if the iCalendar object contains characters that are not part of the US-ASCII character set. [[RFC-2046](#)] discusses the selection of an appropriate "charset" value.

The optional "component" parameter defines the iCalendar component type contained within the iCalendar object.

The following is an example of this header field with a value that indicates an event message.

```
Content-Type: text/calendar; method=request; charset=UTF-8;
            component=vevent
```

The "text/calendar" content type allows for the scheduling message type to be included in a MIME message with other content information (i.e., "multipart/mixed") or included in a MIME message with a clear-text, human-readable form of the scheduling message (i.e., "multipart/alternative").

In order to permit the information in the scheduling message to be understood by MIME user agents (UA) that do not support the "text/calendar" content type, scheduling messages SHOULD be sent with an alternative, human-readable form of the information.

Note that "multiple/alternative" MUST NOT be used to represent two slightly different iCalendar objects, for example two VEVENT with alternative starting times.

CUA can use language and other parameters to pick a "text/calendar" part if a "multipart/alternative" MIME message contains more than one "text/calendar" part.

Any receiving UA compliant with this specification MUST be able to

process "text/calendar" body parts enclosed within "multipart/*". Note that a "multipart/mixed" MIME message can include multiple "text/calendar" components. The receiving UA MUST be able to process all of them.

2.5 Content-Transfer-Encoding

Unless iMIP message is transported over 8-bit clean transport (such as SMTP [[8BITMIME](#)]), a transfer encoding such as quoted-printable or base64 [[RFC-2045](#)] MUST be used for iCalendar objects containing any characters that are not part of the US-ASCII character set.

<<Add examples of 8bit and quoted-printable>>

2.6 Content-Disposition

Implementations MAY include a "Content-Disposition" header field to define a file name for an iCalendar object. However, the handling of a MIME part MUST be based on its [[RFC-2045](#)] "Content-Type" and not on the extension specified in the "Content-Disposition", as different email malware is known to trick User Agents into misinterpreting content of messages by specifying a file extension in the Content-Disposition header field that doesn't correspond to the value of Content-Type header field.

3 Security Considerations

The security threats that applications must address when implementing iTIP are detailed in [[iTIP](#)]. Two spoofing threats are identified: Spoofing the "Organizer", and Spoofing an "Attendee". To address these threats, the originator of an iCalendar object must be authenticated by a recipient. Once authenticated, a determination can be made as to whether or not the originator is authorized to perform the requested operation. Compliant applications **MUST** support signing and encrypting text/calendar attachments using a mechanism based on Security Multiparts for MIME [[RFC-1847](#)] to facilitate the authentication the originator of the iCalendar object. Implementations **MAY** provide a means for users to disable signing and encrypting. The steps are described below:

1. The iCalendar object **MUST** be signed by the "Organizer" sending an update or the "Attendee" sending a reply.
2. Using the security mechanism compliant with [[RFC-1847](#)], determine who signed the iCalendar object. This is the "signer". Note that the signer is not necessarily the person sending an e-mail message since an e-mail message can be forwarded.
3. Correlate the signer to an "ATTENDEE" property in the iCalendar object. If the signer cannot be correlated to an "ATTENDEE" property, ignore the message.
4. Determine whether or not the "ATTENDEE" is authorized to perform the operation as defined by [[iTIP](#)]. If the conditions are not met, ignore the message.
5. If all the above conditions are met, the message can be processed.

To address the confidentiality security threats, signed iMIP messages **SHOULD** be encrypted by a mechanism based on Security Multiparts for MIME [[RFC-1847](#)].

It is possible to receive iMIP messages sent by someone working on behalf of another "Calendar User". This is determined by examining the "sent-by" parameter in the relevant "ORGANIZER" or "ATTENDEE" property. [[iCAL](#)] and [[iTIP](#)] provide no mechanism to verify that a "Calendar User" has authorized someone else to work on their behalf. To address this security issue, implementations **MUST** provide mechanisms for the "Calendar Users" to make that decision before applying changes from someone working on behalf of a "Calendar User".

A security consideration associated with use of Content-Disposition header field is described in [section 2.6](#).

4 Examples

4.1 Single Component With An ATTACH Property

This minimal message shows how an iCalendar object references an attachment. The attachment is accessible via its URL.

```
From: sman@netscape.example.com
To: stevesil@microsoft.example.com
Subject: Phone Conference
Mime-Version: 1.0
Content-Type: text/calendar; method=REQUEST; charset=US-ASCII
Content-Transfer-Encoding: 7bit

BEGIN:VCALENDAR
PRODID:-//ACME/DesktopCalendar//EN
METHOD:REQUEST
VERSION:2.0
BEGIN:VEVENT
ORGANIZER:mailto:sman@netscape.example.com
ATTENDEE;ROLE=CHAIR;ATTSTAT=ACCEPTED:mailto:sman@netscape.example.com
ATTENDEE;RSVP=YES:mailto:stevesil@microsoft.example.com
DTSTAMP:19970611T190000Z
DTSTART:19970701T210000Z
DTEND:19970701T230000Z
SUMMARY:Phone Conference
DESCRIPTION:Please review the attached document.
UID:calsvr.example.com-873970198738777
ATTACH:ftp://ftp.bar.example.com/pub/docs/foo.doc
STATUS:CONFIRMED
END:VEVENT
END:VCALENDAR
```

4.2 Using Multipart Alternative for Low Fidelity Clients

This example shows how a client can emit a multipart message that includes both a plain text version as well as the full iCalendar object. Clients that do not support text/calendar will still be capable of rendering the plain text representation.

```
From: foo1@example.com
To: foo2@example.com
Subject: Phone Conference
Mime-Version: 1.0
Content-Type: multipart/alternative;boundary="01BD3665.3AF0D360"

--01BD3665.3AF0D360
Content-Type: text/plain;charset=us-ascii
```


Content-Transfer-Encoding: 7bit

This is an alternative representation of a TEXT/CALENDAR MIME Object

When: 7/1/1997 10:00AM PDT - 7/1/97 10:30AM PDT

Where:

Organizer: foo1@example.com

Summary: Phone Conference

--01BD3665.3AF0D360

Content-Type: text/calendar; method=REQUEST; charset=US-ASCII

Content-Transfer-Encoding: 7bit

BEGIN:VCALENDAR

PRODID:-//ACME/DesktopCalendar//EN

METHOD:REQUEST

VERSION:2.0

BEGIN:VEVENT

ORGANIZER:mailto:foo1@example.com

ATTENDEE;ROLE=CHAIR;ATTSTAT=ACCEPTED:mailto:foo1@example.com

ATTENDEE;RSVP=YES;CUTYPE=INDIVIDUAL:mailto:foo2@example.com

DTSTAMP:19970611T190000Z

DTSTART:19970701T170000Z

DTEND:19970701T173000Z

SUMMARY:Phone Conference

UID:calsvr.example.com-8739701987387771

SEQUENCE:0

STATUS:CONFIRMED

END:VEVENT

END:VCALENDAR

--01BD3665.3AF0D360

4.3 Single Component With An ATTACH Property and Inline Attachment

This example shows how a message containing an iCalendar object references an attached document. The reference is made using a Content-id (CID). Thus, the iCalendar object and the document are packaged in a multipart/related encapsulation.

From: foo1@example.com

To: foo2@example.com

Subject: Phone Conference

Mime-Version: 1.0

Content-Type: multipart/related; boundary="boundary-example-1"

--boundary-example-1

Content-Type: text/calendar; method=REQUEST; charset=US-ASCII

Content-Transfer-Encoding: 7bit
Content-Disposition: attachment; filename="event.vcs"

BEGIN:VCALENDAR
PRODID:-//ACME/DesktopCalendar//EN
METHOD:REQUEST
VERSION:2.0
BEGIN:VEVENT
ORGANIZER:mailto:foo1@example.com
ATTENDEE;ROLE=CHAIR;ATTSTAT=ACCEPTED:mailto:foo1@example.com
ATTENDEE;RSVP=YES;CUTYPE=INDIVIDUAL:mailto:foo2@example.com
DTSTAMP:19970611T190000Z
DTSTART:19970701T180000Z
DTEND:19970701T183000Z
SUMMARY:Phone Conference
UID:calsvr.example.com-8739701987387771
ATTACH:cid:123456789@example.com
SEQUENCE:0
STATUS:CONFIRMED
END:VEVENT
END:VCALENDAR

--boundary-example-1
Content-Type: application/msword; name="FieldReport.doc"
Content-Transfer-Encoding: base64
Content-Disposition: inline; filename="FieldReport.doc"
Content-ID: <123456789@example.com>

0M8R4KGxGuEAAAAAAAAAAAAAAAAAAGADAP7/CQAGAAAAAAAAAABAAAAA
AAAAEAAAQAAAAEAAAD+////AAAAEUAAD////////////////////////////////
...

--boundary-example-1--

4.4 Multiple Similar Components

Multiple iCalendar components of the same type can be included in the iCalendar object when the METHOD is the same for each component.

From: foo1@example.com
To: foo2@example.com
Subject: Summer Company Holidays
Mime-Version: 1.0
Content-Type: text/calendar; method=PUBLISH; charset=US-ASCII
Content-Transfer-Encoding: 7bit
Content-Disposition: attachment; filename="event.vcs"


```
BEGIN:VCALENDAR
PRODID:-//ACME/DESKTOPCALENDAR//EN
METHOD:PUBLISH
VERSION:2.0
BEGIN:VEVENT
ORGANIZER:MAILTO:FOO1@EXAMPLE.COM
DTSTAMP:19970611T150000Z
DTSTART:19970701T150000Z
DTEND:19970701T230000Z
SUMMARY:Company Picnic
DESCRIPTION:Food and drink will be provided
UID:CALSVR.EXAMPLE.COM-873970198738777-1
SEQUENCE:0
STATUS:CONFIRMED
END:VEVENT
BEGIN:VEVENT
ORGANIZER:MAILTO:FOO1@EXAMPLE.COM
DTSTAMP:19970611T190000Z
DTSTART:19970715T150000Z
DTEND:19970715T230000Z
SUMMARY:Company Bowling Tournament
DESCRIPTION:We have 10 lanes reserved
UID:CALSVR.EXAMPLE.COM-873970198738777-2
SEQUENCE:0
STATUS:CONFIRMED
END:VEVENT
END:VCALENDAR
```

[4.5](#) Multiple Mixed Components

Different component types must be encapsulated in separate iCalendar objects.

```
From: foo1@example.com
To: foo2@example.com
Subject: Phone Conference
Mime-Version: 1.0
Content-Type: multipart/mixed;boundary="--FEE3790DC7E35189CA67CE2C"
```

This is a multi-part message in MIME format.

```
-----FEE3790DC7E35189CA67CE2C
Content-Type: text/calendar; method=REQUEST; charset=US-ASCII
Content-Transfer-Encoding: 7bit
Content-Disposition: attachment; filename="event1.vcs"
```


BEGIN:VCALENDAR
PRODID:-//ACME/DesktopCalendar//EN
METHOD:REQUEST
VERSION:2.0
BEGIN:VEVENT
ORGANIZER:mailto:foo1@example.com
ATTENDEE;ROLE=CHAIR;ATTSTAT=ACCEPTED:mailto:foo1@example.com
ATTENDEE;RSVP=YES;CUTYPE=INDIVIDUAL:mailto:foo2@example.com
DTSTAMP:19970611T190000Z
DTSTART:19970701T210000Z
DTEND:19970701T230000Z
SUMMARY:Phone Conference
DESCRIPTION:Discuss what happened at the last meeting
UID:calsvr.example.com-8739701987387772
SEQUENCE:0
STATUS:CONFIRMED
END:VEVENT
END:VCALENDAR

----FEE3790DC7E35189CA67CE2C
Content-Type: text/calendar; method=REQUEST; charset=US-ASCII
Content-Transfer-Encoding: 7bit
Content-Disposition: attachment; filename="todo1.vcs"

BEGIN:VCALENDAR
PRODID:-//ACME/DesktopCalendar//EN
METHOD:REQUEST
VERSION:2.0
BEGIN:VTODO
DUE:19970701T090000-0700
ORGANIZER:mailto:foo1@example.com
ATTENDEE;ROLE=CHAIR;ATTSTAT=ACCEPTED:mailto:foo1@example.com
ATTENDEE;RSVP=YES:mailto:foo2@example.com
SUMMARY:Phone Conference
DESCRIPTION:Discuss a new location for the company picnic
UID:calsvr.example.com-td-8739701987387773
SEQUENCE:0
STATUS:NEEDS ACTION
END:VEVENT
END:VCALENDAR

----FEE3790DC7E35189CA67CE2C

4.6 Detailed Components With An ATTACH Property

This example shows the format of a message containing a group meeting between three individuals. The multipart/related encapsulation is used because the iCalendar object contains an ATTACH property that uses a CID to reference the attachment.

```
From: foo1@example.com
MIME-Version: 1.0
To: foo2@example.com,foo3@example.com
Subject: REQUEST - Phone Conference
Content-Type: multipart/related;boundary="--FEE3790DC7E35189CA67CE2C"
```

```
----FEE3790DC7E35189CA67CE2C
Content-Type: multipart/alternative;
        boundary="--00FEE3790DC7E35189CA67CE2C00"
```

```
----00FEE3790DC7E35189CA67CE2C00
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit
```

```
When: 7/1/1997 10:00PM PDT- 7/1/97 10:30 PM PDT
Where:
Organizer: foo1@example.com
Summary: Let's discuss the attached document
```

```
----00FEE3790DC7E35189CA67CE2C00

Content-Type: text/calendar; method=REQUEST; charset=US-ASCII;
        Component=vevent
Content-Transfer-Encoding: 7bit
Content-Disposition: attachment; filename="event.vcs"
```

```
BEGIN:VCALENDAR
PRODID:-//ACME/DesktopCalendar//EN
PROFILE:REQUEST
PROFILE-VERSION:1.0
VERSION:2.0
BEGIN:VEVENT
ORGANIZER:foo1@example.com
ATTENDEE;ROLE=CHAIR;ATTSTAT=ACCEPTED:foo1@example.com
ATTENDEE;RSVP=YES;CUTYPE=INDIVIDUAL:mailto:foo2@example.com
ATTENDEE;RSVP=YES;CUTYPE=INDIVIDUAL:mailto:foo3@example.com
DTSTAMP:19970611T190000Z
DTSTART:19970621T170000Z
DTEND:19970621T173000Z
SUMMARY:Let's discuss the attached document
UID:calsvr.example.com-873970198738777-8aa
```


ATTACH:cid:calsvr.example.com-12345aaa
SEQUENCE:0
STATUS:CONFIRMED
END:VEVENT
END:VCALENDAR

----00FEE3790DC7E35189CA67CE2C00

----FEE3790DC7E35189CA67CE2C

Content-Type: application/msword; name="FieldReport.doc"
Content-Transfer-Encoding: base64
Content-Disposition: inline; filename="FieldReport.doc"
Content-ID: <calsvr.example.com-12345aaa>

R0lGODdhTAQZAJEAAFVVvd3d3e4AAP///ywAAAAATAQZAAAC/5yPOS�hD60ctNqLs94Xq
AG4kiW5omm6sq27gvH8kzX9o1y+s73/g8MCofEovGITCoxKMbyCR16cNSq9YrNarfcrvd
riIH5LL5jE6rxc3G+v2cguf0uv20z+v38L7/Dxgo0KjURnjIIbe3yNjo+AgZWYVIWl5i
ZnJY6J

...

----FEE3790DC7E35189CA67CE2C

5 Recommended Practices

This section outlines a series of recommended practices when using a messaging transport to exchange iCalendar objects.

5.1 Use of Content and Message IDs

The [[iCAL](#)] specification makes frequent use of the URI for data types in properties such as "DESCRIPTION", "ATTACH", "CONTACT" and others. Two forms of URIs are Message ID (MID) and Content ID (CID). These are defined in [[RFC-2392](#)]. Although [[RFC-2392](#)] allows referencing messages or MIME body parts in other MIME entities or stores, it is strongly recommended that iMIP implementations include all referenced messages and body parts in a single MIME entity. Simply put, if an iCalendar object contains CID or MID references to other messages or body parts, implementations should ensure that these messages and/or body parts are transmitted with the iCalendar object. If they are not there is no guarantee that the receiving CUA will have the access or the authorization to view those objects.

6 IANA Considerations

Registration of text/calendar MIME Media Type is done in [iCal].

This document doesn't require any additional actions from IANA.

7 References

7.1 Normative References

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[iTIP] Daboo, C., "iCalendar Transport-Independent Interoperability Protocol (iTIP)", work in progress, [draft-ietf-calsify-2446bis-XX.txt](#) (Updates [RFC 2446](#))

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7.2 Informative References

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8 Authors' Addresses

Alexey Melnikov (editor)
Isode Ltd
5 Castle Business Village
36 Station Road
Hampton, Middlesex TW12 2BX
UK

Email: Alexey.Melnikov@isode.com

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Appendix A. Changes since [RFC 2447](#).

Updated references. Split them into Normative and Informative.

Updated examples to use example.com/example.net domains.

Corrected usage of [RFC 2119](#) language.

Clarified that charset=UTF-8 is required, unless the calendar can be entirely represented in US-ASCII.

Clarified that 7-bit content transfer encodings should be used unless the calendar object is known to be transferred over 8-bit clean transport.

Clarified that file extension specified in the Content-Disposition header field is not to be used to override the Content-Type MIME type.

Disallow use of "multiple/alternative" for slightly different representations of the same calendar.

Fixed examples with ATTENDEE property to use CUTYPE= instead of TYPE=

<<TBD>>

