addition, the content type is useful as an object for interactions between desktop applications using the operating system clipboard, drag/drop or file systems capabilities.

This memo is based on the earlier work of the vCalendar specification for the exchange of personal calendaring and scheduling information. In order to avoid confusion with this referenced work, this memo is to be known as the iCalendar specification.

This memo defines the format for specifying iCalendar object methods. An iCalendar object method is a set of usage constraints for the iCalendar object. For example, these methods might define scheduling

3.2 Parameters

Required parameters: none

Optional parameters: charset, method, component and optinfo

The "charset" parameter is defined in [RFC 2046] for other body

4 iCalendar Object Specification

The following sections define the details of a Calendaring and Scheduling Core Object Specification. This information is intended to be an integral part of the MIME content type registration. In addition, this information can be used independent of such content registration. In particular, this memo has direct applicability for use as a calendaring and scheduling exchange format in file-, memory- or network-based transport mechanisms.

4.1 Content Lines

The iCalendar object is organized into individual lines of text, called content lines. Content lines are delimited by a line break,

The content information associated with an iCalendar object is formatted using a syntax similar to that defined by [RFC 2425]. That

4.1.1 List and Field Separators

Some properties and parameters allow a list of values. Values in a list of values MUST be separated by a COMMA character (US-ASCII decimal 44). There is no significance to the order of values in a list. For those parameter values (such as those that specify URI values) that are specified in quoted-strings, the individual quoted-strings are separated by a COMMA character (US-ASCII decimal 44).

Some property values are defined in terms of multiple parts. These structured property values MUST have their value parts separated by a SEMICOLON character (US-ASCII decimal 59).

Some properties allow a list of parameters. Each property parameter in a list of property parameters MUST be separated by a SEMICOLON character (US-ASCII decimal 59).

Property parameters with values containing a COLON, a SEMICOLON or a COMMA character MUST be placed in quoted text.

For example, in the following properties a SEMICOLON is used to separate property parameters from each other, and a COMMA is used to separate property values in a value list.

```
ATTENDEE;RSVP=TRUE;ROLE=REQ-PARTICIPANT:MAILTO:
 jsmith@host.com

RDATE;VALUE=DATE:19970304,19970504,19970704,19970904
```

4.1.2 Multiple Values

Some properties defined in the iCalendar object can have multiple values. The general rule for encoding multi-valued items is to simply create a new content line for each value, including the property name. However, it should be noted that some properties support encoding multiple values in a single property by separating the values with a COMMA character (US-ASCII decimal 44). Individual property definitions should be consulted for determining whether a specific property allows multiple values and in which of these two forms.

4.1.3 Binary Content

Binary content information in an iCalendar object SHOULD be

can be included within an iCalendar object, but only after first encoding it into text using the "BASE64" encoding method defined in [RFC 2045]. Inline binary contact SHOULD only be used in applications whose special circumstances demand that an iCalendar object be

```
dirparam   = "DIR" "=" DQUOTE uri DQUOTE
```

; Some other IANA registered iCalendar data type.

Description: The parameter specifies the free or busy time type. The value FREE indicates that the time interval is free for scheduling. The value BUSY indicates that the time interval is busy because one or more events have been scheduled for that interval. The value BUSY-UNAVAILABLE indicates that the time interval is busy and that the interval can not be scheduled. The value BUSY-TENTATIVE indicates that the time interval is busy because one or more events have been tentatively scheduled for that interval. If not specified on a property that allows this parameter, the default is BUSY.

Example: The following is an example of this parameter on a FREEBUSY property.

FREEBUSY;FBTYPE=BUSY:19980415T133000Z/19980415T170000Z

4.2.10 Language

Parameter Name: LANGUAGE

Purpose: To specify the language for text values in a property or property parameter.

Format Definition: The property parameter is defined by the following notation:

languageparam = "LANGUAGE" "=" language

language = <Text identifying a language, as defined in [RFC 1766]>

Description: This parameter can be specified on properties with a text value type. The parameter iguage, a

The following example makes use of the Quoted-Printable encoding in order to represent non-ASCII characters.

4.2.13 Recurrence Identifier Range

Parameter Name: RANGE

Purpose: To specify the effective range of recurrence instances from the instance specified by the recurrence identifier specified by the property.

Format Definition: The property parameter is defined by the following notation:

```
  rangeparam = "RANGE" "=" ("THISANDPRIOR"
     ; To specify all instances prior to the recurrence identifier
             / "THISANDFUTURE")
     ; To specify the instance specified by the recurrence identifier
     ; and all subsequent recurrence instances
```

Description: The parameter can be specified on a property that specifies a recurrence identifier. The parameter specifies the effective range of recurrence instances that is specified by the property. The effective range is from the recurrence identified

Description: This parameter can be specified on properties with a CAL-ADDRESS value type. The parameter identifies the expectation of a reply from the calendar user specified by the property value. This parameter is used by the "Organizer" to request a participation status reply from an "Attendee" of a group scheduled event or to-do. If not specified on a property that allows this parameter, the default value is FALSE.

Example:

```
ATTENDEE;RSVP=TRUE:MAILTO:jsmith@host.com
```

4.2.18 Sent By

Parameter Name: SENT-BY

Purpose: To specify the calendar user that is acting on behalf of the calendar user specified by the property.

Format Definition: The property parameter is defined by the following notation:

```
sentbyparam        = "SENT-BY" "=" DQUOTE cal-address DQUOTE
```

Description: This parameter can be specified on properties with a CAL-ADDRESS value type. The parameter specifies the calendar user that is acting on behalf of the calendar user specified by the property. The parameter value MUST be a MAILTO URI as defined in [RFC 1738]. The individual calendar address parameter values MUST each be

parameter. If the value type of a property is one of the alternate valid types, then it MUST be explicitly specified with the "VALUE" parameter.

4.3.1 Binary

Value Name: BINARY

Purpose: This value type is used to identify properties that contain a character encoding of inline binary data. For example, an inline attachment of an object code might be included in an iCalendar object.

Formal Definition: The value type is defined by the following notation:

```
binary     = *(4b-char) [b-end]
; A "BASE64" encoded character string, as defined by [RFC 2045].

b-end      = (2b-char "==") / (3b-char "=")

b-char = ALPHA / DIGIT / "+" / "/"
```

```
TSAFE-CHAR = %x20-21 / %x23-2B / %x2D-39 / %x3C-5B
             %x5D-7E / NON-US-ASCII
   ; Any character except CTLs not needed by the current
   ; character set, DQUOTE, ";", ":", "\", ","
```

Note: Certain other character sets may require modification of the above definitions, but this is beyond the scope of this document.

Description: If the property permits, multiple "text" values are specified by a COMMA character (US-ASCII decimal 44) separated list of values.

The language in which the text is represented can be controlled by the "LANGUAGE" property parameter.

An intentional formatted text line break MUST only be included in a "TEXT" property value by representing the line break with the character sequence of BACKSLASH (US-ASCII decimal 92), followed by a LATIN SMALL LETTER N (US-ASCII decimal 110) or a LATIN CAPITAL LETTER N (US-ASCII decimal 78), that is "\n" or "\N".

The "TEXT" property values may also contain special characters that

4.3.12 Time

Value Name: TIME

Purpose: This value type is used to identify values that contain a time of day.

Formal Definition: The data type is defined by the following notation:

```
time               = time-hour time-minute time-second [time-utc]

time-hour          = 2DIGIT        ;00-23
time-minute        = 2DIGIT        ;00-59
time-second        = 2DIGIT        ;00-60
;The "60" value is used to account for "leap" seconds.

time-utc   = "Z"
```

Description: If the property permits, multiple "time" values are specified by a COMMA character (US-ASCII decimal 44) separated list of values. No additional content value encoding (i.e., BACKSLASH character encoding) is defined for this value type.

The "TIME" data type is used to identify values that contain a time of day. The format is based on the [ISO 8601] complete representation, basic format for a time of day. The text format consists of a two-digit 24-hour of the day (i.e., values 0-23), two-digit minute in the hour (i.e., values 0-59), and two-digit seconds in the minute (i.e., values 0-60). The seconds value of 60 MUST only to be used to account for "leap" seconds. Fractions of a second are not supported by this format.

In parallel to the "DATE-TIME" definition above, the "TIME" data type expresses time values in three forms:

The form of time with UTC offset MUST NOT be used. For example, the following is NOT VALID for a time value:

```
230000-0800        ;Invalid time format
```

FORM #1 LOCAL TIME

The local time form is simply a time value that does not contain the UTC designator nor does it reference a time zone. For example, 11:00 PM:

```
230000
```

```
X-TIMEOFDAY:083000

X-TIMEOFDAY:133000Z

X-TIMEOFDAY;TZID=US-Eastern:083000
```

4.3.13 URI

Value Name: URI

Purpose: This value type is used to identify values that contain a

4.5 Property

A property is the definition of an individual attribute describing a calendar or a calendar component. A property takes the form defined by the "contentline" notation defined in section 4.1.1.

The following is an example of a property:

```
DTSTART:19960415T133000Z
```

```
last-mod / location / organizer / priority /
dtstamp / seq / status / summary / transp /
uid / url / recurid /

; either 'dtend' or 'duration' may appear in
; a 'eventprop', but 'dtend' and 'duration'
; MUST NOT occur in the same 'eventprop'

dtend / duration /

; the following are optional,
; and MAY occur more than once

attach / attendee / categories / comment /
contact / exdate / exrule / rstatus / related /
resources / rdate / rrule / x-prop

)
```

Description: A "VEVENT" calendar component is a grouping of component properties, and possibly including "VALARM" calendar components, that represents a scheduled amount of time on a calendar. For example, it

A "VTODO" calendar component without the "DTSTART" and "DUE" (or "DURATION") properties specifies a to-do that will be associated with each successive calendar date, until it is completed.

Example: The following is an example of a "VTODO" calendar component:

```
BEGIN:VTODO
UID:19970901T130000Z-123404@host.com
DTSTAMP:19970901T1300Z
DTSTART:19970415T133000Z
DUE:19970416T045959Z
SUMMARY:1996 Income Tax Preparation
CLASS:CONFIDENTIAL
CATEGORIES:FAMILY,FINANCE
PRIORI I:19 ES:S0415T133000Z
```

"UID" and "DTSTAMP" properties are specified to assist in proper sequencing of multiple free/busy time replies.

When used to publish busy time, the "ORGANIZER" property specifies the calendar user associated with the published busy time; the "DTSTART" and "DTEND" properties specify an inclusive time window that surrounds the busy time information; the "FREEBUSY" property specifies the published busy time information; and the "DTSTAMP" property specifies the date/time that iCalendar object was created.

The "VFREEBUSY" calendar component cannot be nested with iaBUSY" calendarnE" cSniat ca

The following is an example of a "VFREEBUSY" calendar component used to reply to the request with busy time information:

```
BEGIN:VFREEBUSY
ORGANIZER:MAILTO:jane_doe@host1.com
ATTENDEE:MAILTO:john_public@host2.com
DTSTAMP:19970901T100000Z
FREEBUSY;VALUE=PERIOD:19971015T050000Z/PT8H30M,
 19971015T160000Z/PT5H30M,19971015T223000Z/PT6H30M
URL:http://host2.com/pub/busy/jpublic-01.ifb
COMMENT:This iCalendar file contains busy time information for
  the next three months.
END:VFREEBUSY
```

The following is an example of a "VFREEBUSY" calendar component used to publish busy time information.

```
BEGIN:VFREEBUSY
ORGANIZER:jsmith@host.com
DTSTART:19980313T141711Z
DTEND:19980410T141711Z
FREEBUSY:19980314T233000Z/19980315T003000Z
FREEBUSY:19980316T153000Z/19980316T163000Z
FREEBUSY:19980318T030000Z/19980318T040000Z
URL:http://www.host.com/calendar/busytime/jsmith.ifb
END:VFREEBUSY
```

4.6.5 Time Zone Component

Component Name: VTIMEZONE

Purpose: Provide a grouping of component properties that defines a time zone.

Formal Definition: A "VTIMEZONE" calendar component is defined by the following notation:

```
timezonec  = "BEGIN" ":" "VTIMEZONE" CRLF

             2*(

             ; 'tzid' is required, but MUST NOT occur more
             ; than once

            tzid /

             ; 'last-mod' and 'tzurl' are optional,
            but MUST NOT occur more than once
```

last-mod / tzurl /

time zone definition. This is necessary for some classes of events, such as airline flights, that start in one time zone and end in another.

The "VTIMEZONE" calendar component MUST be present if the iCalendar object contains an RRULE that generates dates on both sides of a time zone shift (e.g. both in Standard Time and Daylight Saving Time) unless the iCalendar object intends to convey a floating time (See the section "4.1.10.11 Time" for proper interpretation of floating time). It can be present if the iCalendar object does not contain such a RRULE. In addition, if a RRULE is present, there MUST be valid time zone information for all recurrence instances.

The "VTIMEZONE" calendar component MUST include the "TZID" property and at least one definition of a standard or daylight component. The standard or daylight component MUST include the "DTSTART", "TZOFFSETFROM" and "TZOFFSETTO" properties.

An individual "VTIMEZONE" calendar component MUST be specified for

observance.

The top-level properties in a "VTIMEZONE" calendar component are:

The mandatory "TZID" property is a text value that uniquely identifies the VTIMZONE calendar component within the scope of an iCalendar object.

The optional "LAST-MODIFIED" property is a UTC value that specifies the date and time that this time zone definition was last updated.

The optional "TZURL" property is url value that points to a published VTIMEZONE definition. TZURL SHOULD refer to a resource that is

Formal Definition: A "VALARM" calendar component is defined by the following notation:

```
       alarmc     = "BEGIN" ":" "VALARM" CRLF
                    (audioprop / dispprop / emailprop / procprop)
                    "END" ":" "VALARM" CRLF

  audioprop  = 2*(

             ; 'action' and 'trigger' are both REQUIRED,
             ; but MUST NOT occur more than once

             action / trigger /

             ; 'duration' and 'repeat' are both optional,
             ; and MUST NOT occur more than once each,
             ; but if one occurs, so MUST the other

             duration / repeat /

             ; the following is optional,
             ; but MUST NOT occur more than once

             attach /

             ; the following is optional,
             ; and MAY occur more than once

             x-prop

             )


  dispprop   = 3*(

             ; the following are all REQUIRED,
             ; but MUST NOT occur more than once

             action / description / trigger /

             ; 'duration' and 'repeat' are both optional,
             ; and MUST NOT occur more than once each,
             ; but if one occurs, so MUST the other

             duration / repeat /

             ; the following is optional,
```

Interoperability Protocol (iTIP) defined by [ITIP].

If this property is not present in the iCalendar object, then a scheduling transaction MUST NOT be assumed. In such cases, the iCalendar object is merely being used to transport a snapshot of some calendar information; without the intention of conveying a scheduling semantic.

Format Definition: The property is defined by the following notation:

```
method     = "METHOD" metparam ":" metvalue CRLF by the following notlue Cdar
```

```
pidparam   = *(";" xparam)

pidvalue   = text
;Any text that describes the product and version
;and that is generally assured of being unique.
```

Example: The following is an example of the property with formatted line breaks in the property value:

```
DESCRIPTION:Meeting to provide technical review for "Phoenix"
  design.\n Happy Face Conference Room. Phoenix design team
  MUST attend this meeting.\n RSVP to team leader.
```

The following is an example of the property with folding of long lines:

```
DESCRIPTION:Last draft of the new novel is to be completed
  for the editor’s proof today.
```

4.8.1.6 Geographic Position

Property Name: GEO

Latitudes north of the equator shall be specified by a plus sign (+), or by the absence of a minus sign (-), preceding the digits designating degrees. Latitudes south of the Equator shall be designated by a minus sign (-) preceding the digits designating degrees. A point on the Equator shall be assigned to the Northern Hemisphere.

Longitudes east of the prime meridian shall be specified by a plus sign (+), or by the absence of a minus sign (-), preceding the digits designating degrees. Longitudes west of the meridian shall be designated by minus sign (-) preceding the digits designating degrees. A point on the prime meridian shall be assigned to the Eastern Hemisphere. A point on the 180th meridian shall be assigned to the Western Hemisphere. One exception to this last convention is permitted. For the special condition of describing a band of latitude around the earth, the East Bounding Coordinate data element shall be assigned the value +180 (180) degrees.

Any spatial address with a latitude of +90 (90) or -90 degrees will specify the position at the North or South Pole, respectively. The component for longitude may have any legal value.

With the exception of the special condition described above, this form is specified in Department of Commerce, 1986, Representation of geographic point locations for information interchange (Federal Information Processing Standard 70-1): Washington, Department of Commerce, National Institute of Standards and Technology.

evNNe NNq of

4.8.1.8 Percent Complete

Property Name: PERCENT-COMPLETE

Purpose: This property is used by an assignee or delegatee of a to-do to convey the percent completion of a to-do to the Organizer.

Value Type: INTEGER

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

Conformance: This property can be specified in a "VTODO" calendar component.

Description: The property value is a positive integer between zero

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

Conformance: The property can be specified in a "VEVENT" or "VTODO" calendar component.

Description: The priority is specified as an integer in the range zero to nine. A value of zero (US-ASCII decimal 48) specifies an undefined priority. A value of one (US-ASCII decimal 49) is the highest priority. A value of two (US-ASCII decimal 50) is the second highest priority. Subsequent numbers specify a decreasing ordinal priority. A value of nine (US-ASCII decimal 58) is the lowest priority.

A CUA with a three-level priority scheme of "HIGH", "MEDIUM" and "LOW" is mapped into this property such that a property value in the range of one (US-ASCII decimal 49) to four (US-ASCII decimal 52) specifies "HIGH" priority. A value of five (US-ASCII decimal 53) is the normal or "MEDIUM" priority. A value in the range of six (US-ASCII decimal 54) to nine (US-ASCII decimal 58) is "LOW" priority.

A CUA with a priority schema of "A1", "A2", "A3", "B1", "B2", ..., "C3" is mapped into this property such that a property value of one (US-ASCII decimal 49) specifies "A1", a property value of two (US-ASCII decimal 50) specifies "A2", a property value of three (US-ASCII decimal 51) specifies "A3", and so forth up to a property value of 9 (US-ASCII decimal 58) specifies "C3".

Other integer values are reserved for future use.

Within a "VEVENT" calendar component, this property specifies a priority for the event. This property may be useful when more than one event is scheduled for a given time period.

Within a "VTODO" calendar component, this property specified a priority for the to-do. This property is useful in prioritizing multiple action items for a given time period.

Format Definition: The property is specified by the following notation:

```
priority   = "PRIORITY" prioparam ":" privalue CRLF
;Default is zero

prioparam  = *(";" xparam)

privalue   = integer       ;Must be in the range [0..9]
   ; All other values are reserved for future use
```

```
  compparam  = *(";" xparam)
```

Example: The following is an example of this property:

```
  COMPLETED:19960401T235959Z
```

```
                  *(";" xparam)

                )


    dueval     = date-time / date
    ;Value MUST match value type
```

Example: The following is an example of this property:

```
    DUE:19980430T235959Z
```

4.8.2.4 Date/Time Start

Property Name: DTSTART

Purpose: This property specifies when the calendar component begins.

Value Type: The default value type is DATE-TIME. The time value MUST be one of the forms defined for the DATE-TIME value type. The value type can be set to a DATE value type.

Property Parameters: Non-standard, value data type, time zone identifier property parameters can be specified on this property.

Conformance: This property can be specified in the "VEVENT", "VTODO", "VFREEBUSY", or "VTIMEZONE" calendar components.

Description: Within the "VEVENT" calendar component, this property defines the start date and time for the event. The property is REQUIRED in "VEVENT" calendar components. Events can have a start date/time but no end date/time. In that case, the event does not take up any time.

Within the "VFREEBUSY" calendar component, this property defines the start date and time for the free or busy time information. The time MUST be specified in UTC time.

Within the "VTIMEZONE" calendar component, this property defines the

Conformance: This property can be specified in a "VTIMEZONE" calendar component.

4.8.4 Relationship Component Properties

The following properties specify relationship information in calendar components.

4.8.4.1 Attendee

Property Name: ATTENDEE

Purpose: The property defines an "Attendee" within a calendar component.

Value Type: CAL-ADDRESS

Property Parameters: Non-standard, language, calendar user type, group or list membership, participation role, participation status, RSVP expectation, delegatee, delegator, sent by, common name or directory entry reference property parameters can be specified on this property.

Conformance: This property MUST be specified in an iCalendar object that specifies a group scheduled calendar entity. This property MUST NOT be specified in an iCalendar object when publishing the calendar information (e.g., NOT in an iCalendar object that specifies the publication of a calendar user’s busy time, event, to-do or journal). This property is not specified in an iCalendar object that specifies only a time zone definition or that defines calendar entities that

```
ORGANIZER:MAILTO:jsmith@host1.com
ATTENDEE;ROLE=REQ-PARTICIPANT;PARTSTAT=TENTATIVE;CN=Henry Cabot
 :MAILTO:hcabot@host2.com
ATTENDEE;ROLE=REQ-PARTICIPANT;DELEGATED-FROM="MAILTO:bob@host.com"
 ;PARTSTAT=ACCEPTED;CN=Jane Doe:MAILTO:jdoe@host1.com
```

The following is an example of this property with a URI to the directory information associated with the attendee:

```
ATTENDEE;CN=John Smith;DIR="ldap://host.com:6666/o=eDABC%
 20Industries,c=3DUS??(cn=3DBJim%20Dolittle)":MAILTO:jimdo@
 host1.com
```

The following is an example of this property with "delegatee" and "delegator" information for an event:

```
ORGANIZER;CN=John Smith:MAILTO:jsmith@host.com
ATTENDEE;ROLE=REQ-PARTICIPANT;PARTSTAT=TENTATIVE;DELEGATED-FROM=
 "MAILTO:iamboss@host2.com";CN=Henry Cabot:MAILTO:hcabot@
 host2.com
ATTENDEE;ROLE=NON-PARTICIPANT;PARTSTAT=DELEGATED;DELEGATED-TO=
 "MAILTO:hcabot@host2.com";CN=The Big Cheese:MAILTO:iamboss
 @host2.com
ATTENDEE;ROLE=REQ-PARTICIPANT;PARTSTAT=ACCEPTED;CN=Jane Doe
 :MAILTO:jdoe@host1.com
```

Example: The following is an example of this property's use when another calendar user is acting on behalf of the "Attendee":

```
ATTENDEE;SENT-BY=MAILTO:jan_doe@host1.com;CN=John Smith:MAILTO:
 jsmith@host1.com
```

4.8.4.2 Contact

Property Name: CONTACT

Purpose: The property is used to represent contact information or alternately a reference to contact information associated with the calendar component.

Value Type: TEXT

Property Parameters: Non-standard, alternate text representation and language property parameters can be specified on this property.

Conformance: The property can be specified in a "VEVENT", "VTODO", "VJOURNAL" or "VFREEBUSY" calendar component.

```
                ; the following is optional,
                ; and MAY occur more than once

                (";" xparam)

                )

     ridval     = date-time / date
     ;Value MUST match value type
```

Example: The following are examples of this property:

```
  RECURRENCE-ID;VALUE=DATE:19960401

  RECURRENCE-ID;RANGE=THISANDFUTURE:19960120T120000Z
```

4.8.4.5 Related To

Property Name: RELATED-TO

Purpose: The property is used to represent a relationship or reference between one calendar component and another.

Value Type: TEXT

Property Parameters: NoEwwwe wwlue Type: TEXT

Changes to a calendar component referenced by this property can have an implicit impact on the related calendar component. For example, if a group event changes its start or end date or time, then the related, dependent events will need to have their start and end dates changed in a corresponding way. Similarly, if a PARENT calendar component is canceled or deleted, then there is an implied impact to the related CHILD calendar components. This property is intended only to provide information on the relationship of calendar components. It is up to the target calendar system to maintain any property implications of this relationship.

Purpose: This property defines the list of date/time exceptions for a recurring calendar component.

Value Type: The default value type for this property is DATE-TIME. The value type can be set to DATE.

Property Parameters: Non-standard, value data type and time zone identifier property parameters can be specified on this property.

Conformance: This property can be specified in an iCalendar object that includes a recurring calendar component.

Description: The exception dates, if specified, are used in computing the recurrence set. The recurrence set is the complete set of recurrence instances for a calendar component. The recurrence set is generated by considering the initial "DTSTART" property along with the "RRULE", "RDATE", "EXDATE" and "EXRULE" properties contained within the iCalendar object. The "DTSTART" property defines the first instance in the recurrence set. Multiple instances of the "RRULE" and "EXRULE" properties can also be specified to define more sophisticated recurrence sets. The final recurrence set is generated by gathering all of the start date-times generated by any of the specified "RRULE" and "RDATE" properties, and then excluding any start date and times which fall within the union of start date and times generated by any specified "EXRULE" and "EXDATE" properties. This implies that start date and times within exclusion related properties (i.e., "EXDATE" and "EXRULE") take precedence over those specified by inclusion properties (i.e., "RDATE" and "RRULE"). Where duplicate instances are generated by the "RRULE" and "RDATE" properties, only one recurrence is considered. Duplicate instances are ignored.

The "EXDATE" property can be used to exclude the value specified in "DTSTART". However, in such cases the original "DTSTART" date MUST still be maintained by the calendaring and scheduling system because the original "DTSTART" value has inherent usage dependencies by other properties such as the "RECURRENCE-ID".

Format Definition: The property is defined by the following notation:

```
  exdate     = "EXDATE" exdtparam ":" exdtval *("," exdtval) CRLF

  exdtparam  = *(

             ; the following are optional,
             ; but MUST NOT occur more than once

             (";" "VALUE" "=" ("DATE-TIME" / "DATE")) /
```

properties (i.e., "RDATE" and "RRULE"). Where duplicate instances are generated by the "RRULE" and "RDATE" properties, only one recurrence is considered. Duplicate instances are ignored.

The "EXRULE" property can be used to exclude the value specified in

```
RDATE:19970714T123000Z
RDATE;TZID=US-EASTERN:19970714T083000
RDATE;VALUE=PERIOD:19960403T020000Z/19960403T040000Z,
```

Every 3 hours from 9:00 AM to 5:00 PM on a specific day:

```
DTSTART;TZID=US-Eastern:19970902T090000
RRULE:FREQ=HOURLY;INTERVAL=3;UNTIL=19970902T170000Z

==> (September 2, 1997 EDT)09:00,12:00,15:00
```

Every 15 minutes for 6 occurrences:

```
DTSTART;TZID=US-Eastern:19970902T090000
RRULE:FREQ=MINUTELY;INTERVAL=15;COUNT=6

==> (September 2, 1997 EDT)09:00,09:15,09:30,09:45,10:00,10:15
```

Every hour and a half for 4 occurrences:

```
DTSTART;TZID=US-Eastern:19970902T090000
RRULE:FREQ=MINUTELY;INTERVAL=90;COUNT=4

==> (September 2, 1997 EDT)09:00,10:30;12:00;13:30
```

Every 20 minutes from 9:00 AM to 4:40 PM every day:

```
DTSTART;TZID=US-Eastern:19970902T090000
RRULE:FREQ=DAILY;BYHOUR=9,10,11,12,13,14,15,16;BYMINUTE=0,20,40
or
RRULE:FREQ=MINUTELY;INTERVAL=20;BYHOUR=9,10,11,12,13,14,15,16

==> (September 2, 1997 EDT)9:00,9:20,9:40,10:00,10:20,
                           ... 16:00,16:20,16:40
    (September 3, 1997 EDT)9:00,9:20,9:40,10:00,10:20,
                          ...16:00,16:20,16:40
...
```

An example where the days generated makes a difference because of WKST:

```
DTSTART;TZID=US-Eastern:19970805T090000
RRULE:FREQ=WEEKLY;INTERVAL=2;COUNT=4;BYDAY=TU,SU;WKST=MO

==> (1997 EDT)Aug 5,10,19,24

changing only WKST from MO to SU, yields different results...

DTSTART;TZID=US-Eastern:19970805T090000
RRULE:FREQ=WEEKLY;INTERVAL=2;COUNT=4;BYDAY=TU,SU;WKST=SU
==> (1997 EDT)August 5,17,19,31
```

4.8.6 Alarm Component Properties

The following properties specify alarm information in calendar components.

4.8.6.1 Action

Property Name: ACTION

Purpose: This property defines the action to be invoked when an alarm is triggered.

Value Type: TEXT

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

Conformance: This property MUST be specified once in a "VALARM" calendar component.

Description: Each "VALARM" calendar component has a particular type of action associated with it. This property specifies the type of

Value Type: DATE-TIME

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

Conformance: The property can be specified once in "VEVENT", "VTODO" or "VJOURNAL" calendar components.

Description: The date and time is a UTC value.

Value Type: integer

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

Conformance: The property can be specified in "VEVENT", "VTODO" or

```
               (";" languageparm) /

               ; the following is optional,
               ; and MAY occur more than once

               (";" xparam)

               )

   statcode    = 1*DIGIT *("." 1*DIGIT)
   ;Hierarchical, numeric return status code

   statdesc    = text
   ;Textual status description

   extdata     = text
   ;Textual exception data. For example, the offending property
   ;name and value or complete property line.
```

Example: The following are some possible examples of this property.

```
DUE:19980415T235959
STATUS:NEEDS-ACTION
SUMMARY:Submit Income Taxes
BEGIN:VALARM
ACTION:AUDIO
TRIGGER:19980403T120000
ATTACH;FMTTYPE=audio/basic:http://host.com/pub/audio-
 files/ssbanner.aud
REPEAT:4
DURATION:PT1H
END:VALARM
END:VTODO
END:VCALENDAR
```

The following is an example of a journal entry.

```
BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//ABC Corporation//NONSGML My Product//EN
BEGIN:VJOURNAL    REPEAT:4
```

7. If seconds of the minute are not supported by an implementation, then a value of "00" SHOULD be specified for the seconds component in a time value.

8. If the value type parameter (VALUE=) contains an unknown value type, it SHOULD be treated as TEXT.

9. TZURL values SHOULD NOT be specified as a FILE URI type. This URI form can be useful within an organization, but is problematic in the Internet.

10. Some possible English values for CATEGORIES property include "ANNIVERSARY", "APPOINTMENT", "BUSINESS", "EDUCATION", "HOLIDAY", "MEETING", "MISCELLANEOUS", "NON-WORKING HOURS", "NOT IN OFFICE", "PERSONAL", "PHONE CALL", "SICK DAY", "SPECIAL OCCASION", "TRAVEL", "VACATION". Categories can be specified in any registered language.

11. Some possible English values for RESOURCES property include "CATERING", "CHAIRS", "COMPUTER PROJECTOR", "EASEL", "OVERHEAD PROJECTOR", "SPEAKER PHONE", "TABLE", "TV", "VCR", "VIDEO PHONE", "VEHICLE". Resources can be specified in any registered language.

7 Registration of Content Type Elements

This section provides the process for registration of MIME Calendaring and Scheduling Content Type iCalendar object methods and new or modified properties.

7.1 Registration of New and Modified iCalendar Object Methods

New MIME Calendaring and Scheduling Content Type iCalendar object

Registration of a new property is accomplished by the following steps.

7.2.1 Define the property

A property is defined by completing the following template.

To: ietf-calendar@imc.org

Subject: Registration of text/calendar MIME property XXX

Property name:

Property purpose:

Property value type(s):

Property parameter (s):

Conformance:

Description:

Format definition:

Examples:

Note that the original author or any other interested party can propose a change to an existing property, but that such changes should only be proposed when there are serious omissions or errors in the published memo. The Method Reviewer can object to a change if it

[RFC 2048] Freed, N., Klensin, J. and J. Postel, "Multipurpose

The co-chairman of that working group is:

```
BEGIN:VCARD
VERSION:3.0
N:Moskowitz;Robert
FN:Robert Moskowitz
EMAIL;TYPE=INTERNET:rgm-ietf@htt-consult.com
END:VCARD
```