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VPOLL: Consensus Scheduling Component for iCalendar
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Abstract

This specification introduces a new iCalendar component which allows for consensus scheduling, that is, voting on a number of meeting or task alternatives.

Status of This Memo

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1. Introduction

The currently existing approach to agreeing on meeting times using iTIP [RFC5546] and/or iMIP [RFC6047] have some significant failings. There is no useful bargaining or suggestion mechanism in iTIP, only the ability for a potential attendee to accept or refuse or to counter with a time of their own choosing.

Part of the problem is that for many potential attendees, their freebusy is not an accurate representation of their availability. In fact, when trying to schedule conference calls across different organizations, attendees may not be allowed to provide freebusy

information or availability as this may reveal something of the organizations internal activities.

A number of studies have shown that large amounts of time are spent trying to come to an agreement - up to and beyond 20 working hours per meeting. Many organizers fall back on other approaches such as phone calls and email to determine a suitable time.

Online services have appeared as a result and these allow participants to vote on a number of alternatives without revealing or using freebusy or availability. When agreement is reached a conventional scheduling message may be sent to the attendees. This approach appears to reach consensus fairly rapidly. Peer pressure may have some bearing on this as all voters are usually able to see the current state of the voting and may adjust their own meeting schedules to make themselves available for a popular choice.

The components and properties defined in this specification provide a standardized structure for this process and allow calendar clients and servers and web based services to interact.

These structures also have uses beyond the relatively simple needs of most meeting organizers. The process of coming to consensus can also be viewed as a bidding process.

2. Conventions and Terms Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

Additionally this document uses the following terms:

Consensus Scheduling: The process whereby parties come to some agreement on meeting or task alternatives and then book that meeting or task.

Active VPOLL: A VPOLL may have a DTSTART, DTEND and DURATION which may define the start and end of the active voting period.

Voter: A participant who votes on the alternatives. A voter need not be an attendee of any of the alternatives presented.

3. Simple Consensus Scheduling

This specification defines components and properties which can be used for simple consensus scheduling but also have the generality to handle more complex cases. To provide an easy (and for many - sufficient) introduction to consensus scheduling and VPOLL we will outline the flow of information for the simple case of voting on a number of meeting alternatives which differ only in time. In addition the voters will all be potential attendees.

This specification not only defines data structures but adds a new iTIP method used to broadcast teh status of the poll. This document will show how a VPOLL object is used to inform voters of the state of a simple vote on some alternatives.

3.1. The VPOLL Component: An Overview

The VPOLL component acts as a wrapper for a number of alternatives to be voted on, together with some properties and a new component used to maintain the state of the voting. For our simple example the following VPOLL properties and sub-components are either required or appropriate:

DTSTAMP: The usual [RFC5545] property.

SEQUENCE: The usual [RFC5545] property. See below for SEQUENCE behavior.

UID: The usual [RFC5545] property.

ORGANIZER: The usual [RFC5545] property. In general this need not be an organizer of any of the alternatives. In this simple outline we assume it is the same.

SUMMARY: The usual [RFC5545] property. This optional but recommended property provides a short title to the poll.

DESCRIPTION: The usual [RFC5545] property. This optional property provides more details.

DTEND: The usual [RFC5545] property. This optional property provides a poll closing time and date after which the VPOLL is no longer active.

POLL-MODE: A new property which defines how the votes are used to obtain a result. For our use case it will take the value "BASIC" meaning one event will be chosen from the alternatives.

POLL-COMPLETION: A new property which defines who (server or client) chooses and/or submits the winning choice. In our example the value is "SERVER-SUBMIT" which means the client chooses the winner but the server will submit the winning choice.

POLL-PROPERTIES: A new property which defines which iCalendar properties are being voted on. For our use case it will take the value "DTSTART, LOCATION" meaning only those properties are significant for voting. Other properties in the events may differ but are not considered significant for the voting process.

VVOTER: A new component. There is one of these for each voter and it contains a VOTER property to identify the voter and one VOTE component for each item being voted on.

VOTE: A new component. There is one of these for each voter choice. It usually contains at least a POLL-ITEM-ID property to identify the choice and a RESPONSE property to provide a vote. For more complex poll modes it may contain other information such as cost or estimated duration.

VOTER: A new property. There is one of these for each voter and it is similar to the [RFC5545] ATTENDEE property. It identifies the VVOTER component to show who is taking part in the voting and their results.

VEVENT: In our simple use case there will be multiple VEVENT sub-components defining the alternatives. Each will have a different date and or time for the meeting.

Putting that together we can construct an example VPOLL with 3 voters and 3 alternative meetings:

```
BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//Example//Example
METHOD:REQUEST
BEGIN:VPOLL
POLL-MODE:BASIC
POLL-COMPLETION:SERVER-SUBMIT
POLL-PROPERTIES:DTSTART,LOCATION
ORGANIZER:mailto:mike@example.com
UID:sched01-1234567890
DTSTAMP:20120101T000000Z
SUMMARY:What to do this week
DTEND:20120101T000000Z
BEGIN: VVOTER
VOTER:mailto:cyrus@example.com
END VVOTER
BEGIN: VVOTER
VOTER:mailto:eric@example.com
END VVOTER
BEGIN: VVOTER
VOTER:mailto:mike@example.com
END VVOTER
BEGIN:VEVENT.......(with a poll-item-id=1)
END:VEVENT
BEGIN:VEVENT.......(with a poll-item-id=2)
END:VEVENT
BEGIN:VEVENT.......(with a poll-item-id=3)
END:VEVENT
END:VPOLL
END:VCALENDAR
```

As can be seen in the example above, there is an iTIP METHOD property with the value REQUEST. The VPOLL object will be distributed to all the voters, either through iMIP or through some VPOLL enabled service.

3.2. The VPOLL Candidate Subcomponents

Within the VPOLL component we have the alternatives to vote on. These are standard [RFC5545] components. For our simple use case they are all VEVENT components. In addition to the usual [RFC5545] properties the POLL-ITEM-ID property is used for a VPOLL to identify the choice.

POLL-ITEM-ID: This provides a unique reference to the sub-component within the VPOLL. It's value SHOULD be a small integer.

3.3. VPOLL responses

Upon receipt of a VPOLL REQUEST the voter will reply with a VPOLL component containing their vote. In our simple case it will have the following properties and components:

DTSTAMP: The usual [RFC5545] property.

SEQUENCE: The usual [RFC5545] property. See below for SEQUENCE behavior.

UID: Same as the request.

ORGANIZER: Same as the request.

SUMMARY: Same as the request.

VVOTER: One only.

VOTER: One only inside the VVOTER component - the voter replying.

VOTE: One per item being voted on inside the VVOTER component. There does not need to be one for each choice.

POLL-ITEM-ID: One inside each VOTE component to identify the choice.

RESPONSE: One inside each VOTE component to specify the vote.

Note that a voter can send a number of REPLYs for each REQUEST sent by the organizer. Each REPLY completely replaces the voting record for that voter for all components being voted on. In our example, if Eric responds and votes for items 1 and 2 and then responds again with a vote for only item 3, the final outcome is one vote on item 3.

Putting this together we can construct an example REPLY VPOLL from Cyrus:

```
BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//Example//Example
METHOD: REPLY
BEGIN:VPOLL
ORGANIZER:mailto:mike@example.com
UID:sched01-1234567890
DTSTAMP:20120101T010000Z
SUMMARY:What to do this week
BEGIN:VVOTER
VOTER:mailto:cyrus@example.com
BEGIN:VOTE
POLL-ITEM-ID:1
RESPONSE:50
COMMENT:Work on iTIP
END:VOTE
BEGIN:VOTE
POLL-ITEM-ID:2
RESPONSE:100
COMMENT:Work on WebDAV
END:VOTE
BEGIN:VOTE
POLL-ITEM-ID:3
RESPONSE:0
END:VOTE
END:VVOTER
END:VPOLL
END:VCALENDAR
```

3.4. VPOLL updates

When the organizer receives a response from one or more voters the current state of the poll is sent to all voters. The new iTIP method POLLSTATUS is used. The VPOLL can contain a reduced set of properties but MUST contain DTSTAMP, SEQUENCE (if not 0), UID, ORGANIZER and one or more VVOTER components each populated with a VOTER property and zero or more VOTE components.

An example:

```
BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//Example//Example
METHOD: POLLSTATUS
BEGIN:VPOLL
ORGANIZER:mailto:mike@example.com
UID:sched01-1234567890
DTSTAMP:20120101T020000Z
SEQUENCE:0
SUMMARY:What to do this week
BEGIN:VVOTER
VOTER:mailto:cyrus@example.com
BEGIN: VOTE
POLL-ITEM-ID:1
RESPONSE:50
COMMENT:Work on iTIP
END:VOTE
BEGIN:VOTE
POLL-ITEM-ID:2
RESPONSE:100
COMMENT:Work on WebDAV
END:VOTE
BEGIN:VOTE
POLL-ITEM-ID:3
RESPONSE:0
END:VOTE
END:VVOTER
BEGIN:VVOTER
VOTER:mailto:eric@example.com
BEGIN:VOTE
POLL-ITEM-ID:1
RESPONSE:100
END:VOTE
BEGIN:VOTE
POLL-ITEM-ID:2
RESPONSE:100
END:VOTE
BEGIN:VOTE
POLL-ITEM-ID:3
RESPONSE:0
END:VOTE
END:VVOTER
END:VPOLL
END:VCALENDAR
```

3.5. VPOLL Completion

After a number of REPLY messages have been received the poll will be considered complete. If there is a DTEND on the poll the system may automatically close the poll, or the organizer may, at any time, consider the poll complete. A VPOLL can be completed (and effectively closed for voting) by sending an iTIP REQUEST message with the VPOLL STATUS property set to COMPLETED.

The poll winner is confirmed by sending a final iTIP REQUEST message with the VPOLL STATUS property set to CONFIRMED. In this case the VPOLL component contains all the events being voted on along with a POLL-WINNER property to identify the winning event.

The VPOLL confirmation example:

```
BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//Example//Example
METHOD: REQUEST
BEGIN:VPOLL
ORGANIZER:mailto:douglm@example.com
UID:sched01-1234567890
DTSTAMP:20120101T030000Z
COMPLETED:20120101T030000Z
POLL-COMPLETION:SERVER-SUBMIT
SEQUENCE:0
SUMMARY:What to do this week
STATUS:CONFIRMED
POLL-WINNER:3
BEGIN:VEVENT.......(with a poll-item-id=1)
END:VEVENT
BEGIN:VEVENT.......(with a poll-item-id=2)
END:VEVENT
BEGIN:VEVENT.......(with a poll-item-id=3)
END:VEVENT
END:VPOLL
END:VCALENDAR
```

Note that as the POLL-COMPLETION property is set to SERVER-SUBMIT the server will submit the winning choice and when it has done so set the STATUS to "SUBMITTED".

3.6. Other Responses

A voter being asked to choose between a number of ORGANIZER supplied alternatives may find none of them acceptable or may simply not care.

An alternative response, which may be disallowed, is to send back the respondees availability or freebusy or even one or more new, alternative choices.

This is accomplished by responding with a VOTE component which has no POLL-ITEM-ID property. In this case it MUST contain some alternative information. What form this takes depends on the poll mode in effect.

4. iCalendar Extensions

4.1. Updated Relation Type Value

Relationship parameter type values are defined in section 3.2.15. of [RFC5545]. This specification updates that type to include the new relationship value POLL to provide a link to the VPOLL component in which the current component appears.

Format Definition:

This property parameter is redefined by the following notation:

```
reltypeparam       /= "RELTYPE" "=" "POLL"
      ; Property value is a VPOLL uid
```

Description: This parameter can be specified on a property that references another related calendar component. The new parameter value indicates that the associated property references a VPOLL component which contains the current component.

4.2. Updated Status Value

Status property values are defined in section 3.8.1.11. of [RFC5545]. This specification updates that type to define valid VPOLL status values.

Format Definition:

This property parameter is redefined by the following notation:

```
statvalue /= statvalue-poll
        ; Status values for "VPOLL".
statvalue-poll = "IN-PROCESS"
               / "COMPLETED"  ; Poll has closed,
                              ; nothing has been chosen yet
               / "CONFIRMED"  ; Poll has closed and
                              ; winning items confirmed
               / "SUBMITTED"  ; The winning item has been
                              ; submitted
               / "CANCELLED"
```

Description: These values allow clients and servers to handle the choosing and submission of winning choices.

If the client is choosing and the server submitting then the client should set the POLL-WINNER property, set the status to CONFIRMED and save the poll. When the server submits the winning choice it will set the status to SUBMITTED.

4.3. New Property Parameters

4.3.1. Required

Parameter name: REQUIRED

Purpose: To specify whether the associated property is required in the current context.

Format Definition:

This parameter is defined by the following notation:

```
requirededparam = "REQUIRED"  "=" ("TRUE" / "FALSE")
                                  ; Default is FALSE
```

Description: This parameter MAY be specified on REPLY-URL and, if the value is TRUE, indicates the organizer requires all replies to be made via the specified service rather than iTIP replies.

4.3.2. Stay-Informed

Parameter name: STAY-INFORMED

Purpose: To specify the voter also wants to be added as an ATTENDEE when the poll is confirmed.

Format Definition:

This parameter is defined by the following notation:

```
    stayinformedparam = "STAY-INFORMED"  "=" ("TRUE" / "FALSE")
                    ; Default is FALSE
```

Description: This parameter MAY be specified on VOTER and, if the value is TRUE, indicates the voter wishes to be added to the final choice as a non participant.

4.4. New Properties

4.4.1. Accept-Response

Property name: ACCEPT-RESPONSE

Purpose: This property is used in VPOLL to indicate the types of component that may be supplied in a response.

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

Conformance: This property MAY be specified in a VPOLL component.

Description: When used in a VPOLL this property indicates what allowable component types may be returned in a reply. Typically this would allow a voter to respond with their freebusy or availability rather than choosing one of the presented alternatives

If this property is not present voters are only allowed to respond to the choices in the request.

Format Definition:

This property is defined by the following notation:

```
  acceptresponse = "ACCEPT-RESPONSE" acceptresponseparams ":"
                       iana-token ("," iana-token) CRLF

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

4.4.2. Poll-Completion

Property name: POLL-COMPLETION

Purpose: This property is used in VPOLL to indicate whether the client or server is responsible for choosing and/or submitting the winner(s).

Description: When a VPOLL is stored on a server which is capable of handling choosing and submission of winning choices a value of SERVER indicates that the server should close the poll, choose the winner and submit whenever it is appropriate to do so.

For example, in BASIC poll-mode, reaching the DTEND of the poll could trigger this server side action.

Server initiated submission requires that the submitted choice MUST be a valid calendaring component.

POLL-COMPLETION=SERVER-SUBMIT allows the client to set the poll-winner, set the status to CONFIRMED and then store the poll on the server. The server will then submit the winning choice and set the status to SUBMITTED.

Format Definition:

This property is defined by the following notation:

```
poll-completion = "POLL-COMPLETION" pcparam ":" pcvalue CRLF

pcparam = *(";" other-param)

pcvalue = "SERVER"  ; The server is responsible for both choosing and
                    ; submitting the winner(s)
         / "SERVER-SUBMIT" ; The server is responsible for
                    ; submitting the winner(s). The client chooses.
         / "SERVER-CHOICE"  ; The server is responsible for
                    ; choosing the winner(s). The client will submit.
         / "CLIENT" ; The client is responsible for both choosing and
                    ; submitting the winner(s)
         / iana-token
         / x-name
         ;Default is CLIENT
```

Example:

The following is an example of this property:

```
  POLL-COMPLETION: SERVER-SUBMIT
```

4.4.3. Poll-Item-Id

Property name: POLL-ITEM-ID

Purpose: This property is used in VPOLL child components as an identifier.

Value type: INTEGER

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

Conformance: This property MUST be specified in a VOTE component and in VPOLL choice items.

Description: In a METHOD:REQUEST each choice component MUST have a POLL-ITEM-ID property. Each set of components with the same POLL-ITEM-ID value represents one overall set of items to be voted on.

POLL-ITEM-ID SHOULD be a unique small integer for each component or set of components. If it remains the same between REQUESTs then the previous response for that component MAY be re-used. To force a re-vote on a component due to a significant change, the POLL-ITEM-ID MUST change.

Format Definition:

This property is defined by the following notation:

```
  pollitemid = "POLL-ITEM-ID" pollitemdparams ":"
                     integer CRLF

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

4.4.4. Poll-Mode

Property name: POLL-MODE

Purpose: This property is used in VPOLL to indicate what voting mode is to be applied.

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

Conformance: This property MAY be specified in a VPOLL component. If not specified it defaults to BASIC.

Description: The poll mode defines how the votes are applied to obtain a result. BASIC mode, the default, means that the voters are selecting one component (or group of components) with a given POLL=ITEM-ID.

Other polling modes may be defined in updates to this specification. These may allow for such modes as ranking or task assignment.

Format Definition: or its sub-components

This property is defined by the following notation:

```
pollmode = "POLL-MODE" pollmodeparams ":"
           ("BASIC" / iana-token / other-token) CRLF

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

4.4.5. Poll-properties

Property name: POLL-PROPERTIES

Purpose: This property is used in VPOLL to define which icalendar properties are being voted on.

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

Conformance: This property MAY be specified in a VPOLL component.

Description: This property defines which icalendar properties are significant in the voting process. It may not be clear to voters which properties are varying in a significant manner. Clients may use this property to highlight those listed properties.

Format Definition:

This property is defined by the following notation:

```
pollproperties = "POLL-PROPERTIES" pollpropparams ":"
           text *("," text) CRLF

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

4.4.6. Poll-Winner

Property name: POLL-WINNER

Purpose: This property is used in a basic mode VPOLL to indicate which of the VPOLL sub-components won.

Value type: INTEGER

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

Conformance: This property MAY be specified in a VPOLL component.

Description: For poll confirmation each child component MUST have a POLL-ITEM-ID property. For basic mode the VPOLL component SHOULD have a POLL-WINNER property which MUST correspond to one of the POLL-ITEM-ID properties and indicates which sub-component was the winner.

Format Definition:

This property is defined by the following notation:

```
  pollwinner = "POLL-WINNER" pollwinnerparams ":"
                    integer CRLF

  pollwinnerparams = *(";" other-param)

          ; Used with a STATUS:CONFIRMED VPOLL to indicate which
          ; components have been confirmed
```

4.4.7. Reply-URL

Property name: REPLY-URL

Purpose: This property may be used in scheduling messages to indicate additional reply methods, for example a web-service.

Property Parameters: Non-standard, required or iana parameters can be specified on this property.

Conformance: This property MAY be specified in a VPOLL component.

Description: When used in a scheduling message this property indicates additional or required services that can be used to reply. Typically this would be a web service of some form.

Format Definition:

This property is defined by the following notation:

```
reply-url = "REPLY-URL" reply-urlparams ":" uri CRLF

reply-urlparams = *(
                   (";" requiredparam) /
                   (";" other-param)
                   )
```

4.4.8. Response

Property name: RESPONSE

Purpose: To specify a response vote.

Value type: INTEGER

Format Definition:

This property is defined by the following notation:

```
response = "RESPONSE" response-params ":" integer CRLF
                 ; integer value 0..100

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

Description: This property is used in VOTE components to provide the value of the voters response. This property allows for fine grained responses which are appropriate to some applications. For the case of individuals voting for a choice of events, client applications SHOULD conform to the following convention for the value:

* 0 - 39 A "NO vote".

* 40 - 79 A "MAYBE" vote

* 80 - 89 A "YES - but not preferred vote"

* 90-100 A "YES" vote.

Clients MUST preserve the response value when there is no change from the user even if they have a UI with fixed states (e.g. yes/no/maybe).

4.4.9. Voter

Property name: VOTER

Purpose: This property is used in VVOTER components to indicate recipients of the poll and to identify that component as containing the voters responses.

Value type: The value type for this property is cal-address.

Property Parameters: Non-standard, cutype, member, role, rsvp, delto, delfrom, sentby, cn, dir, lang or stayinformed parameters can be specified on this property.

Conformance: This property MAY be specified in a VPOLL component or its sub-components.

Description: This property appears in the VVOTER component only and indicates a recipient of the poll and their responses.

Format Definition:

This property is defined by the following notation:

```
  voter = "VOTER" voterparams ":" cal-address CRLF

  voterparam   = *(
                     ;
                     ; The following are OPTIONAL,
                     ; but MUST NOT occur more than once.
                     ;
                     (";" cutypeparam) / (";" memberparam) /
                     (";" roleparam) /
                     (";" rsvpparam) / (";" deltoparam) /
                     (";" delfromparam) / (";" sentbyparam) /
                     (";" cnparam) / (";" dirparam) /
                     (";" languageparam) /
                     (";" stayinformedparam) /

                     ;
                     ; The following are OPTIONAL, but MUST NOT occur
                     ; more than once. They are defined in RFC6638
                     ;
                     (";" scheduleagentparam) /
                     (";" scheduleforcesendparam) /
                     (";" schedulestatusparam) /

                     ;
                     ; The following is OPTIONAL,
                     ; and MAY occur more than once.
                     ;
                     (";" other-param)
                     ;
               )
```

Note 1 RSVP=TRUE MAY be used by the organizer to force the voter to reset their state and re-vote.

Note 2 scheduleagentparam, scheduleforcesendparam and schedulestatusparam are all related to CalDAV scheduling and are defined in [RFC6638]. Their semantics are exactly as defined in that specification.

4.5. New Components

4.5.1. VPOLL Component

Component name: VPOLL

Purpose: This component provides a mechanism by which voters can vote on provided choices.

Format Definition:

This component is defined by the following notation:

```
  pollc    = "BEGIN" ":" "VPOLL" CRLF
               pollprop
               *voterc *eventc *todoc *journalc *freebusyc
               *availabilityc *alarmc *iana-comp *x-comp
               "END" ":" "VPOLL" CRLF

  pollprop = *(
             ;
             ; The following are REQUIRED,
             ; but MUST NOT occur more than once.
             ;
             dtstamp / uid / organizer /
             ;
             ; The following are OPTIONAL,
             ; but MUST NOT occur more than once.
             ;
             acceptresponse / class / created / completed /
             description / dtstart / last-mod / pollmode /
             pollproperties / priority / seq / status /
             summary / url /
             ;
             ; Either 'dtend' or 'duration' MAY appear in
             ; a 'pollprop', but 'dtend' and 'duration'
             ; MUST NOT occur in the same 'pollprop'.
             ; 'duration' MUST only occur when 'dtstart'
             ; is present
             ;
             dtend / duration /
             ;
             ; The following are OPTIONAL,
             ; and MAY occur more than once.
             ;
             attach / categories / comment /
             contact / rstatus / related /
             resources / x-prop / iana-prop
             ;
             ; The following is OPTIONAL, it SHOULD appear
             ; once for the confirmation of a BASIC mode
             ; VPOLL. Other modes may define differing
             ; requirements.
             ;
             pollwinner /
             ;
             )
```

Description: This component provides a mechanism by which voters can vote on provided choices. The outcome depends upon the POLL-MODE in effect.

The VVOTER components in VPOLL requests provide information on each recipient who will be voting - both their identity through the VOTER property and their votes through the VOTE components.

If specified, the "DTSTART" property defines the start or opening of the poll active period. If absent the poll is presumed to have started when created.

If "DTSTART" is present "DURATION" MAY be specified and indicates the duration, and hence the ending, of the poll. The value of the property MUST be a positive duration.

"DTEND" MAY be specified with or without "DTSTART" and indicates the ending of the poll. If DTEND is specified it MUST be later than the DTSTART or CREATED property.

If one or more VALARM components are included in the VPOLL they are not components to be voted on and MUST NOT contain a POLL-ITEM-ID property. VALARM sub-components may be used to provide warnings to the user when polls are due to start or end.

Need some text to describe what relative alarms are relative to.

4.5.2. VVOTER Component

Component name: VPOLL

Purpose: This component contains identification of the recipient and voter and their responses.

Format Definition:

This property is defined by the following notation:

```
  voterc   = "BEGIN" ":" "VVOTER" CRLF
             voterprop
             *votec *iana-comp *x-comp
             "END" ":" "VVOTER" CRLF

  voterprop = *(
             ;
             ; The following are REQUIRED,
             ; but MUST NOT occur more than once.
             ;
             dtstamp  / voter /
             ;
             ; The following are OPTIONAL,
             ; but MUST NOT occur more than once.
             ;
             created / description / last-mod / seq /
             status / summary / url /
             ;
             ; The following are OPTIONAL,
             ; and MAY occur more than once.
             ;
             attach / categories / comment /
             contact / rstatus / related /
             resources / x-prop / iana-prop
             ;
             )
```

Description: This component contains a VOTER property identifying a recipient and voter and zero or more VOTE components containing their responses.

The VOTER property in VVOTER objects refers to a recipient who will be voting - RSVP=TRUE is used by the organizer to force the voter to reset their state and re-vote

4.5.3. VOTE Component

Component name: VPOLL

Purpose: This component contains the vote for a single choice.

Format Definition:

This component is defined by the following notation:

```
votec     = "BEGIN" ":" "VOTE" CRLF
            voteprop
            *eventc *todoc *journalc *freebusyc
            *availabilityc *alarmc *iana-comp *x-comp
            "END" ":" "VOTE" CRLF

voteprop = *(
           ;
           ; The following are OPTIONAL,
           ; but MUST NOT occur more than once.
           ;
           pollitemid / response /
           ;
           ; The following are OPTIONAL,
           ; and MAY occur more than once.
           ;
           comment / x-prop / iana-prop
           ;
           )
```

Description: This component contains the voters response for a single choice.

The required and optional properties and their meanings depend upon the POLL-MODE in effect.

For any POLL-MODE, POLL-ITEM-ID is used to associate the information to a choice supplied by the organizer.

If allowed by the POLL-MODE a VOTE component without a POLL-ITEM-ID may be provided in a REPLY to indicate a possible new choice or to provide information to the ORGANIZER - such as the respondees availability.

5. Poll Modes

The VPOLL component is intended to allow for various forms of polling. The particular form in efffect is indicated by the POLL-MODE property.

New poll modes can be registered by including a completed POLL-MODE Registration Template (see Section 9.3) in a published RFC.

5.1. POLL-MODE:BASIC

BASIC poll mode is the form of voting in which one possible outcome is chosen from a set of possibilities. Usually this will be represented as a number of possible event or task objects one of which will be selected.

5.1.1. Property restrictions

This poll mode has the following property requirements:

POLL-ITEM-ID: Each contained sub-component or group of sib-components that is being voted upon MUST contain a POLL-ITEM_ID property which is unique within the context of the POLL. The value MUST NOT be reused when events are removed and/or added to the poll.

POLL-WINNER: On confirmation of the poll this property MUST be present and identifies the winning component or set of components.

5.1.2. Outcome reporting

To confirm the winner the POLL-WINNER property MUST be present and the STATUS MUST be set to CONFIRMED.

When the winning VEVENT or VTODO is not a scheduled entity, that is, it has no ORGANIZER or ATTENDEES it MUST be assigned an ORGANIZER property and a list of non-participating ATTENDEEs. This allows the winning entity to be distributed to the participants through iTIP or some other protocol.

6. iTIP Extensions

This specification introduces a number of extensions to [RFC5546]. In group scheduling the parties involved are organizer and attendees. In VPOLL the parties are organizer and voters.

For many of the iTIP processing rules the voters take the place of attendees.

6.1. Methods

There are some extensions to the behavior of iTIP methods for a VPOLL object and one new method is defined.

Method	Description
PUBLISH	No changes (yet)
REQUEST	Each child component MUST have a POLL-ITEM-ID property. Each set of components with the same POLL-ITEM-ID value represents one overall set of items to be voted on.
REPLY	There MUST be a single VPOLL component which MUST contain a single VVOTER component. That VVOTER component MUST contain a single VOTER property identifying the voter and 0 or more VOTE components. A VOTE component contains either a single POLL-ITEM-ID and a single RESPONSE property providing the vote for a particular item or a VFREEBUSY or VAVAILABILITY child component showing overall busy/available time.
ADD	Not supported for VPOLL.
CANCEL	There MUST be a single VPOLL component with UID matching that of the poll being cancelled.
REFRESH	The organizer returns a METHOD:REQUEST with the current full state, or a METHOD:CANCEL or an error if no matching poll is found.
COUNTER	Not supported for VPOLL.
DECLINECOUNTER	Not supported for VPOLL.
POLLSTATUS	Used to send the current state of the poll to all voters. The VPOLL can contain a reduced set of properties but MUST contain DTSTAMP, SEQUENCE (if not 0), UID, ORGANIZER properties and VVOTER components.

The following table shows the above methods broken down by who can send them with VPOLL components.

Originator	Methods
Organizer	CANCEL, PUBLISH, REQUEST, POLLSTATUS
Voter	REPLY, REFRESH, REQUEST (only when delegating)

6.2. Interoperability Models

Most of the standard iTIP specification applies with respect to organizer and voters.

6.2.1. Delegation

TBD

6.2.2. Acting on Behalf of Other Calendar Users

TBD

6.2.3. Component Revisions

Need to talk about what a change in SEQUENCE means
Sequence change forces a revote.
New voter - no sequence change
Add another poll set or change poll item ids or any change to a child component - bump sequence

6.2.4. Message Sequencing

TBD

6.3. Application Protocol Elements

6.3.1. Methods for VPOLL Calendar Components

This section defines the property set restrictions for the method types that are applicable to the "VPOLL" calendar component. Each method is defined using a table that clarifies the property constraints that define the particular method.

The presence column uses the following values to assert whether a property is required or optional, and the number of times it may appear in the iCalendar object.

Presence Value	Description
1	One instance MUST be present.
1+	At least one instance MUST be present.
0	Instances of this property MUST NOT be present.
0+	Multiple instances MAY be present.
0 or 1	Up to 1 instance of this property MAY be present.

The following summarizes the methods that are defined for the "VPOLL" calendar component.

Method	Description
PUBLISH	Post notification of an poll. Used primarily as a method of advertising the existence of a poll.
REQUEST	To make a request for a poll. This is an explicit invitation to one or more voters. Poll requests are also used to update, change or confirm an existing poll. Clients that cannot handle REQUEST MAY degrade the poll to view it as a PUBLISH. REQUEST SHOULD NOT be used just to set the status of the poll - POLLSTATUS provides a more compact approach.
REPLY	Reply to a poll request. Voters may set the RESPONSE properties to supply the current vote in the range 0 to 100.
CANCEL	Cancel a poll.
REFRESH	A request is sent to an Organizer by a Voter asking for the latest version of a poll to be resent to the requester.
POLLSTATUS	Used to send the current state of the poll to all voters. The VPOLL can contain a reduced set of properties but MUST contain DTSTAMP, SEQUENCE (if not 0), UID, ORGANIZER properties and VVOTER components.

6.3.1.1. PUBLISH

The "PUBLISH" method in a "VPOLL" calendar component is an unsolicited posting of an iCalendar object. Any CU may add published components to their calendar. The "Organizer" MUST be present in a published iCalendar component. "VOTER" proerties MUST NOT be present in the VVOTER components. Its expected usage is for encapsulating an arbitrary poll as an iCalendar object. The "Organizer" may subsequently update (with another "PUBLISH" method) or cancel (with a "CANCEL" method) a previously published "VPOLL" calendar component.

This method type is an iCalendar object that conforms to the following property constraints:

Constraints for a METHOD:PUBLISH of a VPOLL

Component/Property	Presence	Comment
METHOD	1	MUST equal PUBLISH.
VPOLL	1+	
DTSTAMP	1	
DTSTART	0 or 1	If present defines the start of the poll. Otherwise the poll starts when it is created and distributed.
ORGANIZER	1	
SUMMARY	1	Can be null.
UID	1	
SEQUENCE	0 or 1	MUST be present if value is greater than 0; MAY be present if 0.
ACCEPT-RESPONSE	0 or 1	
ATTACH	0+	
CATEGORIES	0+	
CLASS	0 or 1	
COMMENT	0+	
COMPLETED	0 or 1	
CONTACT	0 or 1	
CREATED	0 or 1	
DESCRIPTION	0 or 1	Can be null.
DTEND	0 or 1	If present, DURATION MUST NOT be present.
DURATION	0 or 1	If present, DTEND MUST NOT be

		present.
LAST-MODIFIED	0 or 1	
POLL-ITEM-ID	0	
POLL-MODE	0 or 1	
POLL-PROPERTIES	0 or 1	
PRIORITY	0 or 1	
RELATED-TO	0+	
RESOURCES	0+	
STATUS	0 or 1	MAY be one of COMPLETED/CONFIRMED/CANCELLED.
URL	0 or 1	
IANA-PROPERTY	0+	
X-PROPERTY	0+	
REQUEST-STATUS	0	
VTIMEZONE	0+	MUST be present if any date/time refers to a timezone.
. .VALARM	0+	
. .VEVENT	0+	Depending upon the poll mode in effect there MAY be candidate components included in the poll component.
. .VFREEBUSY	0	
. .VJOURNAL	0+	Depending upon the poll mode in effect there MAY be candidate components included in the poll component.
. .VTODO	0+	Depending upon the poll mode in effect there MAY be candidate components included in the poll component.
. .VVOTER	0+	If voting has already taken place, these components contain VOTE components to indicate each voters current response.
. . . .VOTER	1	Identifies the voter for the VVOTER component.
. . . .VOTE	0+	Provides the VOTER responses for each choice.
. .IANA-COMPONENT	0+	
. .X-COMPONENT	0+	

6.3.1.2. REQUEST

The "REQUEST" method in a "VPOLL" component provides the following scheduling functions:

- Invite "Voters" to respond to the poll.
- Change the items being voted upon.
- Complete or confirm the poll.
- Response to a "REFRESH" request.
- Update the details of an existing vpoll.
- Update the status of "Voters".
- Forward a "VPOLL" to another uninvited CU.
- For an existing "VPOLL" calendar component, delegate the role of "Voter" to another CU.
- For an existing "VPOLL" calendar component, change the role of "Organizer" to another CU.

The "Organizer" originates the "REQUEST". The recipients of the "REQUEST" method are the CUs voting in the poll, the "Voters". "Voters" use the "REPLY" method to convey votes to the "Organizer".

The "UID" and "SEQUENCE" properties are used to distinguish the various uses of the "REQUEST" method. If the "UID" property value in the "REQUEST" is not found on the recipient's calendar, then the "REQUEST" is for a new "VPOLL" calendar component. If the "UID" property value is found on the recipient's calendar, then the "REQUEST" is for an update, or a reconfirmation of the "VPOLL" calendar component.

For the "REQUEST" method only a single iCalendar object is permitted.

This method type is an iCalendar object that conforms to the following property constraints:

```
          +-----------------------------------------------+
          | Constraints for a METHOD:REQUEST of a VPOLL   |
          +-----------------------------------------------+
          +-----------------------------------------------+

+--------------------+----------+-----------------------------------+
```

Component/Property	Presence	Comment
METHOD	1	MUST be REQUEST.
VPOLL	1	
VOTER	1+	
DTSTAMP	1	
DTSTART	0 or 1	If present defines the start of the poll. Otherwise the poll starts when it is created and distributed.
ORGANIZER	1	
SEQUENCE	0 or 1	MUST be present if value is greater than 0; MAY be present if 0.
SUMMARY	1	Can be null.
UID	1	
ACCEPT-RESPONSE	0 or 1	
ATTACH	0+	
CATEGORIES	0+	
CLASS	0 or 1	
COMMENT	0+	
COMPLETED	0 or 1	
CONTACT	0+	
CREATED	0 or 1	
DESCRIPTION	0 or 1	Can be null.
DTEND	0 or 1	If present, DURATION MUST NOT be present.
DURATION	0 or 1	If present, DTEND MUST NOT be present.
GEO	0 or 1	
LAST-MODIFIED	0 or 1	
LOCATION	0 or 1	
POLL-ITEM-ID	0	
POLL-MODE	0 or 1	
POLL-PROPERTIES	0 or 1	
PRIORITY	0 or 1	
RELATED-TO	0+	
REQUEST-STATUS	0	
RESOURCES	0+	
STATUS	0 or 1	MAY be one of COMPLETED/CONFIRMED/CANCELLED.
TRANSP	0 or 1	
URL	0 or 1	
IANA-PROPERTY	0+	
X-PROPERTY	0+	
VALARM	0+	

VTIMEZONE	0+	MUST be present if any date/time refers to a timezone.
IANA-COMPONENT	0+	
X-COMPONENT	0+	
VEVENT	0+	Depending upon the poll mode in effect there MAY be candidate components included in the poll component.
VFREEBUSY	0	
VJOURNAL	0+	Depending upon the poll mode in effect there MAY be candidate components included in the poll component.
VTODO	0+	Depending upon the poll mode in effect there MAY be candidate components included in the poll component.

6.3.1.2.1. Rescheduling a poll

The "REQUEST" method may be used to reschedule a poll, that is force a revote. A rescheduled poll involves a change to the existing poll in terms of its time the components being voted on may have changed. If the recipient CUA of a "REQUEST" method finds that the "UID" property value already exists on the calendar but that the "SEQUENCE" (or "DTSTAMP") property value in the "REQUEST" method is greater than the value for the existing poll, then the "REQUEST" method describes a rescheduling of the poll.

6.3.1.2.2. Updating or Reconfirmation of a Poll

The "REQUEST" method may be used to update or reconfirm a poll. An update to an existing poll does not involve changes to the time or candidates, and might not involve a change to the location or description for the poll. If the recipient CUA of a "REQUEST" method finds that the "UID" property value already exists on the calendar and that the "SEQUENCE" property value in the "REQUEST" is the same as the value for the existing poll, then the "REQUEST" method describes an update of the poll details, but not a rescheduling of the POLL.

The update "REQUEST" method is the appropriate response to a "REFRESH" method sent from a "Voter" to the "Organizer" of a poll.

The "Organizer" of a poll may also send unsolicited "REQUEST" methods. The unsolicited "REQUEST" methods may be used to update the details of the poll without rescheduling it, to update the "RESPONSE" property values, or to reconfirm the poll.

6.3.1.2.3. Confirmation of a Poll

The "REQUEST" method may be used to confirm a poll, that is announce the winner in BASIC mode. The STATUS MUST be set to CONFIRMED and for BASIC mode a VPOLL POLL-WINNER property must be provided with the poll-id of the winning component.

6.3.1.2.4. Closing a Poll

The "REQUEST" method may be used to close a poll, that is indicate voting is completed. The STATUS MUST be set to COMPLETED.

6.3.1.2.5. Delegating a POll to Another CU

Some calendar and scheduling systems allow "Voters" to delegate the vote to another "Calendar User". iTIP supports this concept using the following workflow. Any "Voter" may delegate their right to vote in a poll to another CU. The implication is that the delegate participates in lieu of the original "Voter", NOT in addition to the "Voter". The delegator MUST notify the "Organizer" of this action using the steps outlined below. Implementations may support or restrict delegation as they see fit. For instance, some implementations may restrict a delegate from delegating a "REQUEST" to another CU.

The "Delegator" of a poll forwards the existing "REQUEST" to the "Delegate". The "REQUEST" method MUST include a "Voter" property with the calendar address of the "Delegate". The "Delegator" MUST also send a "REPLY" method to the "Organizer" with the "Delegator's" "Voter" property "DELEGATED-TO" parameter set to the calendar address of the "Delegate". Also, a new "Voter" property for the "Delegate" MUST be included and must specify the calendar user address set in the "DELEGATED-TO" parameter, as above.

In response to the request, the "Delegate" MUST send a "REPLY" method to the "Organizer", and optionally to the "Delegator". The "REPLY" method SHOULD include the "Voter" property with the "DELEGATED-FROM" parameter value of the "Delegator's" calendar address.

The "Delegator" may continue to receive updates to the poll even though they will not be attending. This is accomplished by the "Delegator" setting their "role" attribute to "NON-PARTICIPANT" in the "REPLY" to the "Organizer".

6.3.1.2.6. Changing the Organizer

The situation may arise where the "Organizer" of a "VPOLL" is no longer able to perform the "Organizer" role and abdicates without passing on the "Organizer" role to someone else. When this occurs, the "Voters" of the "VPOLL" may use out-of-band mechanisms to communicate the situation and agree upon a new "Organizer". The new "Organizer" should then send out a new "REQUEST" with a modified version of the "VPOLL" in which the "SEQUENCE" number has been incremented and the "ORGANIZER" property has been changed to the new "Organizer".

6.3.1.2.7. Sending on Behalf of the Organizer

There are a number of scenarios that support the need for a "Calendar User" to act on behalf of the "Organizer" without explicit role changing. This might be the case if the CU designated as "Organizer" is sick or unable to perform duties associated with that function. In these cases, iTIP supports the notion of one CU acting on behalf of another. Using the "SENT-BY" parameter, a "Calendar User" could send an updated "VPOLL" "REQUEST". In the case where one CU sends on behalf of another CU, the "Voter" responses are still directed back towards the CU designated as "Organizer".

6.3.1.2.8. Forwarding to an Uninvited CU

A "Voter" invited to a "VPOLL" calendar component may send the "VPOLL" calendar component to another new CU not previously associated with the "VPOLL" calendar component. The current "Voter" participating in the "VPOLL" calendar component does this by forwarding the original "REQUEST" method to the new CU. The new CU can send a "REPLY" to the "Organizer" of the "VPOLL" calendar component. The reply contains a "Voter" property for the new CU.

The "Organizer" ultimately decides whether or not the new CU becomes part of the poll and is not obligated to do anything with a "REPLY" from a new (uninvited) CU. If the "Organizer" does not want the new CU to be part of the poll, the new "Voter" property is not added to the "VPOLL" calendar component. The "Organizer" MAY send the CU a "CANCEL" message to indicate that they will not be added to the poll. If the "Organizer" decides to add the new CU, the new "Voter" property is added to the "VPOLL" calendar component. Furthermore, the "Organizer" is free to change any "Voter" property parameter from

the values supplied by the new CU to something the "Organizer" considers appropriate. The "Organizer" SHOULD send the new CU a "REQUEST" message to inform them that they have been added.

When forwarding a "REQUEST" to another CU, the forwarding "Voter" MUST NOT make changes to the original message.

6.3.1.2.9. Updating Voter Status

The "Organizer" of an poll may also request updated status from one or more "Voters". The "Organizer" sends a "REQUEST" method to the "Voter" and sets the "VOTER;RSVP=TRUE" property parameter. The "SEQUENCE" property for the poll is not changed from its previous value. A recipient will determine that the only change in the "REQUEST" is that their "RSVP" property parameter indicates a request for updated status. The recipient SHOULD respond with a "REPLY" method indicating their current vote with respect to the "REQUEST".

6.3.1.3. REPLY

The "REPLY" method in a "VPOLL" calendar component is used to respond (e.g., accept or decline) to a "REQUEST" or to reply to a delegation "REQUEST". When used to provide a delegation response, the "Delegator" SHOULD include the calendar address of the "Delegate" on the "DELEGATED-TO" property parameter of the "Delegator's" "Voter" property. The "Delegate" SHOULD include the calendar address of the "Delegator" on the "DELEGATED-FROM" property parameter of the "Delegate's" "Voter" property.

The "REPLY" method is also used when processing of a "REQUEST" fails. Depending on the value of the "REQUEST-STATUS" property, no action may have been performed.

The "Organizer" of a poll may receive the "REPLY" method from a CU not in the original "REQUEST". For example, a "REPLY" may be received from a "Delegate" to a poll. In addition, the "REPLY" method may be received from an unknown CU (a "Party Crasher"). This uninvited "Voter" may be accepted, or the "Organizer" may cancel the poll for the uninvited "Voter" by sending a "CANCEL" method to the uninvited "Voter".

A "Voter" MAY include a message to the "Organizer" using the "COMMENT" property. For example, if the user indicates a low interest and wants to let the "Organizer" know why, the reason can be expressed in the "COMMENT" property value.

The "Organizer" may also receive a "REPLY" from one CU on behalf of another. Like the scenario enumerated above for the "Organizer",

"Voters" may have another CU respond on their behalf. This is done using the "SENT-BY" parameter.

The optional properties listed in the table below (those listed as "0+" or "0 or 1") MUST NOT be changed from those of the original request. (But see comments on VFREEBUSY and VAVAILABILITY)

This method type is an iCalendar object that conforms to the following property constraints:

Constraints for a METHOD:REPLY of a VPOLL

Component/Property	Presence	Comment
METHOD	1	MUST be REPLY.
VPOLL	1+	All components MUST have the same UID.
VOTER	1	MUST be the address of the Voter replying.
DTSTAMP	1	
ORGANIZER	1	
UID	1	MUST be the UID of the original REQUEST.
SEQUENCE	0 or 1	If non-zero, MUST be the sequence number of the original REQUEST. MAY be present if 0.
ACCEPT-RESPONSE	0 or 1	
ATTACH	0+	
CATEGORIES	0+	
CLASS	0 or 1	
COMMENT	0+	
COMPLETED	0 or 1	
CONTACT	0+	
CREATED	0 or 1	
DESCRIPTION	0 or 1	
DTEND	0 or 1	If present, DURATION MUST NOT be present.
DTSTART	0 or 1	
DURATION	0 or 1	If present, DTEND MUST NOT be present.
GEO	0 or 1	
LAST-MODIFIED	0 or 1	
LOCATION	0 or 1	

POLL-ITEM-ID	1+	One per item being voted on.
POLL-MODE	0	
POLL-PROPERTIES	0	
PRIORITY	0 or 1	
RELATED-TO	0+	
RESOURCES	0+	
REQUEST-STATUS	0+	
STATUS	0 or 1	
SUMMARY	0 or 1	
TRANSP	0 or 1	
URL	0 or 1	
IANA-PROPERTY	0+	
X-PROPERTY	0+	
VALARM	0	
VTIMEZONE	0 or 1	MUST be present if any date/time refers to a timezone.
IANA-COMPONENT	0+	
X-COMPONENT	0+	
VEVENT	0	
VFREEBUSY	0 or 1	A voter may respond with a VFREEBUSY component indicating that the ORGANIZER may select some other time which is not marked as busy.
VAVAILABILITY	0	A voter may respond with a VAVAILABILITY component indicating that the ORGANIZER may select some other time which is shown as available.
VJOURNAL	0	
VTODO	0	

6.3.1.4. CANCEL

The "CANCEL" method in a "VPOLL" calendar component is used to send a cancellation notice of an existing poll request to the affected "Voters". The message is sent by the "Organizer" of the poll.

The "Organizer" MUST send a "CANCEL" message to each "Voter" affected by the cancellation. This can be done using a single "CANCEL" message for all "Voters" or by using multiple messages with different subsets of the affected "Voters" in each.

When a "VPOLL" is cancelled, the "SEQUENCE" property value MUST be incremented as described in Section 6.2.3.

Once a CANCEL message has been sent to all voters no further voting may take place. The poll is considered closed.

This method type is an iCalendar object that conforms to the following property constraints:

Constraints for a METHOD:CANCEL of a VPOLL

Component/Property	Presence	Comment
METHOD	1	MUST be CANCEL.
VPOLL	1+	All must have the same UID.
VOTER	0+	MUST include some or all Voters being removed from the poll. MUST include some or all Voters if the entire poll is cancelled.
UID	1	MUST be the UID of the original REQUEST.
DTSTAMP	1	
ORGANIZER	1	
SEQUENCE	1	
ATTACH	0+	
ACCEPT-RESPONSE	0	
COMMENT	0+	
COMPLETED	0 or 1	
CATEGORIES	0+	
CLASS	0 or 1	
CONTACT	0+	
CREATED	0 or 1	
DESCRIPTION	0 or 1	
DTEND	0 or 1	If present, DURATION MUST NOT be present.
DTSTART	0 or 1	
DURATION	0 or 1	If present, DTEND MUST NOT be present.

GEO	0 or 1	
LAST-MODIFIED	0 or 1	
LOCATION	0 or 1	
POLL-ITEM-ID	0	
POLL-MODE	0	
POLL-PROPERTIES	0	
PRIORITY	0 or 1	
RELATED-TO	0+	
RESOURCES	0+	
STATUS	0 or 1	MUST be set to CANCELLED to cancel the entire event. If uninviting specific Attendees, then MUST NOT be included.
SUMMARY	0 or 1	
TRANSP	0 or 1	
URL	0 or 1	
IANA-PROPERTY	0+	
X-PROPERTY	0+	
REQUEST-STATUS	0	
VALARM	0	
VTIMEZONE	0+	MUST be present if any date/time refers to a timezone.
IANA-COMPONENT	0+	
X-COMPONENT	0+	
VTODO	0	
VJOURNAL	0	
VEVENT	0	
VFREEBUSY	0	

6.3.1.5. REFRESH

The "REFRESH" method in a "VPOLL" calendar component is used by "Voters" of an existing event to request an updated description from the poll "Organizer". The "REFRESH" method must specify the "UID" property of the poll to update. The "Organizer" responds with the latest description and version of the poll.

This method type is an iCalendar object that conforms to the following property constraints:

Constraints for a METHOD:REFRESH of a VPOLL

Component/Property	Presence	Comment
METHOD	1	MUST be REFRESH.
VPOLL	1	
VOTER	1	MUST be the address of requester.
DTSTAMP	1	
ORGANIZER	1	
UID	1	MUST be the UID associated with original REQUEST.
COMMENT	0+	
COMPLETED	0	
IANA-PROPERTY	0+	
X-PROPERTY	0+	
ACCEPT-RESPONSE	0	
ATTACH	0	
CATEGORIES	0	
CLASS	0	
CONTACT	0	
CREATED	0	
DESCRIPTION	0	
DTEND	0	
DTSTART	0	
DURATION	0	
GEO	0	
LAST-MODIFIED	0	
LOCATION	0	
POLL-ITEM-ID	0	
POLL-MODE	0	
POLL-PROPERTIES	0	
PRIORITY	0	
RELATED-TO	0	
REQUEST-STATUS	0	
RESOURCES	0	
SEQUENCE	0	
STATUS	0	
SUMMARY	0	
URL	0	
VALARM	0	
VTIMEZONE	0+	

IANA-COMPONENT	0+	
X-COMPONENT	0+	
VTODO	0	
VJOURNAL	0	
VEVENT	0	
VFREEBUSY	0	

6.3.1.6. POLLSTATUS

The "POLLSTATUS" method in a "VPOLL" calendar component is used to inform recipients of the current status of the poll in a compact manner. The "Organizer" MUST be present in the confirmed poll component. "Voters" MUST NOT be present. The selected component(s) according to the poll mode MUST also be present in the poll component. Clients receiving this message may store the confirmed items in their calendars.

This method type is an iCalendar object that conforms to the following property constraints:

Constraints for a METHOD:POLLSTATUS of a VPOLL

Component/Property	Presence	Comment
METHOD	1	MUST equal POLLSTATUS.
VPOLL	1+	
COMPLETED	0 or 1	Only present for a completed poll
DTSTAMP	1	
DTSTART	0 or 1	
ORGANIZER	1	
SUMMARY	1	Can be null.
VOTER	1+	
UID	1	
SEQUENCE	0 or 1	MUST be present if value is greater than 0; MAY be present if 0.
ACCEPT-RESPONSE	0	

ATTACH	0	
CATEGORIES	0	
CLASS	0	
COMMENT	0+	
CONTACT	0	
CREATED	0 or 1	
DESCRIPTION	0 or 1	Can be null.
DTEND	0 or 1	If present, DURATION MUST NOT be present.
DURATION	0 or 1	If present, DTEND MUST NOT be present.
LAST-MODIFIED	0 or 1	
POLL-ITEM-ID	0	
POLL-MODE	0 or 1	
POLL-PROPERTIES	0	
PRIORITY	0 or 1	
RELATED-TO	0+	
RESOURCES	0+	
STATUS	0 or 1	MAY be one of TENTATIVE/CONFIRMED/CANCELLED.
URL	0 or 1	
IANA-PROPERTY	0+	
X-PROPERTY	0+	
REQUEST-STATUS	0	
VALARM	0+	
VEVENT	0+	All candidate components MUST be present but in a reduced form sufficient to provide the voting status.
VFREEBUSY	0	
VJOURNAL	0+	All candidate components MUST be present but in a reduced form sufficient to provide the voting status.
VTODO	0+	All candidate components MUST be present but in a reduced form sufficient to provide the voting status.
VTIMEZONE	0+	MUST be present if any date/time refers to a timezone.
IANA-COMPONENT	0+	

| X-COMPONENT | 0+ | |
+---+---+---+

7. CalDAV Extensions

This specification extends [RFC4791] in that it defines a new component and new iCalendar properties to be supported and requires extra definitions related to time-ranges and reports.

Additionally, it extends [RFC6638] as a VPOLL component is a schedulable entity.

7.1. Calendar Collection Properties

This section defines new CalDAV properties for calendar collections.

7.1.1. CALDAV:supported-vpoll-component-sets

Name: supported-vpoll-component-sets

Namespace: urn:ietf:params:xml:ns:caldav

Purpose: Specifies the calendar component types (e.g., VEVENT, VTODO, etc.) and combination of types that may be included in a VPOLL component.

Conformance: This property MAY be defined on any calendar collection. If defined, it MUST be protected and SHOULD NOT be returned by a PROPFIND DAV:allprop request (as defined in Section 12.14.1 of [RFC4918]).

Description: The CALDAV:supported-vpoll-component-sets property is used to specify restrictions on the calendar component types that VPOLL components may contain in a calendar collection.

It also specifies the combination of allowed component types.

Any attempt by the client to store VPOLL components with component types or combinations of types not listed in this property, if it exists, MUST result in an error, with the CALDAV:supported-vpoll-component-sets precondition defined in Section 7.2 being violated. Since this property is protected, it cannot be changed by clients using a PROPPATCH request. However, clients can initialize the value of this property when creating a new calendar collection with extended MKCOL or MKCALENDAR. In the absence of this property, the server MUST accept all component types, and the client can assume that all component types are accepted.

Definition:

```
<!ELEMENT supported-vpoll-component-sets
       (supported-vpoll-component-set*) >

<!ELEMENT supported-vpoll-component-set (comp+)>
```

Example:

```
<C:supported-vpoll-component-sets
     xmlns:C="urn:ietf:params:xml:ns:caldav">

  <!-- VPOLLs with VEVENT, VFREEBUSY or VTODO -->
  <C:supported-vpoll-component-set>
    <C:comp name="VEVENT" />
    <C:comp name="VFREEBUSY" />
    <C:comp name="VTODO" />
  </C:supported-vpoll-component-set>

  <!-- VPOLLs with just VEVENT or VFREEBUSY -->
  <C:supported-vpoll-component-set>
    <C:comp name="VEVENT" />
    <C:comp name="VFREEBUSY" />
  </C:supported-vpoll-component-set>

  <!-- VPOLLs with just VEVENT -->
  <C:supported-vpoll-component-set>
    <C:comp name="VEVENT" />
  </C:supported-vpoll-component-set>

  <!-- VPOLLs with just VTODO -->
  <C:supported-vpoll-component-set>
    <C:comp name="VTODO" />
  </C:supported-vpoll-component-set>
</C:supported-vpoll-component-sets>
```

7.1.2. CALDAV:vpoll-max-items

Name: vpoll-max-items

Namespace: urn:ietf:params:xml:ns:caldav

Purpose: Provides a numeric value indicating the maximum number of choice items that may be contained in any instance of a VPOLL calendar object resource stored in the calendar collection.

Individual members of a group of choices all count towards the total, that is, a group does NOT count as a single item.

Conformance: This property MAY be defined on any calendar collection. If defined, it MUST be protected and SHOULD NOT be returned by a PROPFIND DAV:allprop request (as defined in Section 12.14.1 of [RFC4918]).

Description: The CALDAV:vpoll-max-items is used to specify a numeric value that indicates the maximum number of iCalendar components in any one instance of a VPOLL calendar object resource stored in a calendar collection. Any attempt to store a calendar object resource with more components per instance than this value MUST result in an error, with the CALDAV: vpoll-max-items precondition Section 7.2 being violated. In the absence of this property, the client can assume that the server can handle any number of items in a VPOLL calendar component.

Definition:

```
<!ELEMENT vpoll-max-items (#PCDATA)>
PCDATA value: a numeric value (integer greater than zero)
```

Example:

```
<C:vpoll-max-items
     xmlns:C="urn:ietf:params:xml:ns:caldav"
>25</C:vpoll-max-items>
```

7.1.3. CALDAV:vpoll-max-active

Name: vpoll-max-active

Namespace: urn:ietf:params:xml:ns:caldav

Purpose: Provides a numeric value indicating the maximum number of active vpolls at any one time.

Conformance: This property MAY be defined on any calendar collection. If defined, it MUST be protected and SHOULD NOT be returned by a PROPFIND DAV:allprop request (as defined in Section 12.14.1 of [RFC4918]).

Description: The CALDAV:vpoll-max-active is used to specify a numeric value that indicates the maximum number of active VPOLLs at any one time. Any attempt to store a new active VPOLL calendar

object resource which results in exceeding this limit MUST result in an error, with the CALDAV: vpoll-max-active precondition Section 7.2 being violated. In the absence of this property, the client can assume that the server can handle any number of active VPOLLs.

Definition:

```
<!ELEMENT vpoll-max-active (#PCDATA)>
PCDATA value: a numeric value (integer greater than zero)
```

Example:

```
<C:vpoll-max-active
     xmlns:C="urn:ietf:params:xml:ns:caldav"
>25</C:vpoll-max-active>
```

7.1.4. CALDAV:vpoll-max-voters

Name: vpoll-max-voters

Namespace: urn:ietf:params:xml:ns:caldav

Purpose: Provides a numeric value indicating the maximum number of voters for any instance of a VPOLL calendar object resource stored in the calendar collection.

Conformance: This property MAY be defined on any calendar collection. If defined, it MUST be protected and SHOULD NOT be returned by a PROPFIND DAV:allprop request (as defined in Section 12.14.1 of [RFC4918]).

Description: The CALDAV:vpoll-max-voters is used to specify a numeric value that indicates the maximum number of VOTER properties for any one instance of a VPOLL calendar object resource stored in a calendar collection. Any attempt to store a calendar object resource with more VOTER properties per instance than this value MUST result in an error, with the CALDAV: vpoll-max-voters precondition Section 7.2 being violated. In the absence of this property, the client can assume that the server can handle any number of voters in a VPOLL calendar component.

Definition:

```
<!ELEMENT vpoll-max-voters (#PCDATA)>
PCDATA value: a numeric value (integer greater than zero)
```

Example:

```
<C:vpoll-max-voters
     xmlns:C="urn:ietf:params:xml:ns:caldav"
>25</C:vpoll-max-voters>
```

7.1.5. CalDAV:even-more-properties

1. vpoll-supported-mode poll options - e.g "vpoll-basic"

7.1.6. Extensions to CalDAV scheduling

This specification extends [RFC6638].

Each section of Appendix A "Scheduling Privileges Summary" is extended to include VPOLL.

Any reference to the ATTENDEE property should be read to include the VOTER property. That is, for scheduling purposes the VOTER property is handled in exactly the same manner as the ATTENDEE property.

7.2. Additional Preconditions for PUT, COPY, and MOVE

This specification creates additional Preconditions for PUT, COPY, and MOVE methods. These preconditions apply when a PUT operation of a VPOLL calendar object resource into a calendar collection occurs, or when a COPY or MOVE operation of a calendar object resource into a calendar collection occurs, or when a COPY or MOVE operation occurs on a calendar collection.

The new preconditions are:

(CALDAV:supported-vpoll-component-sets): The VPOLL resource submitted in the PUT request, or targeted by a COPY or MOVE request, MUST contain a type or combination of calendar component that is supported in the targeted calendar collection;

(CALDAV:vpoll-max-items): The VPOLL resource submitted in the PUT request, or targeted by a COPY or MOVE request, MUST have a number of sub-components (excluding VTIMEZONE) less than or equal to the value of the CALDAV:vpoll-max-items property value Section 7.1.2 on the calendar collection where the resource will be stored;

(CALDAV:vpoll-max-active): The PUT request, or COPY or MOVE request, MUST not result in the number of active VPOLLs being greater than the value of the CALDAV:vpoll-max-active property value Section 7.1.3 on the calendar collection where the resource will be stored;

(CALDAV:vpoll-max-voters): The VPOLL resource submitted in the PUT request, or targeted by a COPY or MOVE request, MUST have a number of VOTER properties less than or equal to the value of the CALDAV:vpoll-max-voters property value Section 7.1.4 on the calendar collection where the resource will be stored;

7.3. CalDAV:calendar-query Report

This allows the retrieval of VPOLLs and their included components. The query specification allows queries to be directed at the contained sub-components. For VPOLL queries this feature is disallowed. Time-range queries can only target the vpoll component itself.

7.3.1. Example: Partial Retrieval of VPOLL

In this example, the client requests the server to return specific components and properties of the VPOLL components that overlap the time range from December 4, 2012, at 00:00:00 A.M. UTC to December 5, 2012, at 00:00:00 A.M. UTC. In addition, the DAV:getetag property is also requested and returned as part of the response. Note that due to the CALDAV: calendar-data element restrictions, the DTSTAMP property in VPOLL components has not been returned, and the only property returned in the VCALENDAR object is VERSION.

```
>> Request <<

REPORT /cyrus/work/ HTTP/1.1
Host: cal.example.com
Depth: 1
Content-Type: application/xml; charset="utf-8"
Content-Length: xxxx

<?xml version="1.0" encoding="utf-8" ?>
<C:calendar-query xmlns:D="DAV:"
                  xmlns:C="urn:ietf:params:xml:ns:caldav">
  <D:prop>
    <D:getetag/>
    <C:calendar-data>
      <C:comp name="VCALENDAR">
        <C:prop name="VERSION"/>
        <C:comp name="VPOLL">
```

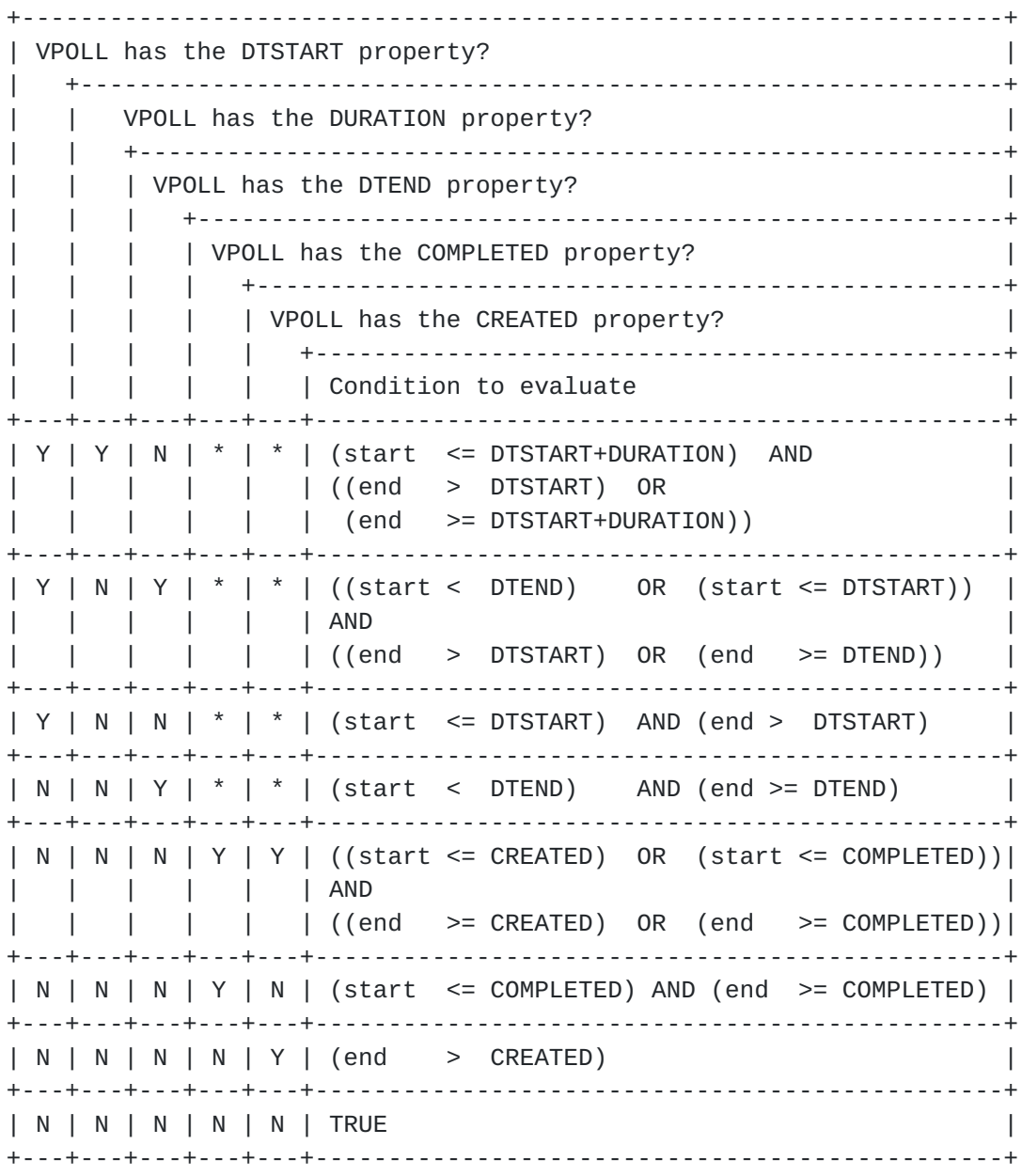
```
            <C:prop name="SUMMARY"/>
            <C:prop name="UID"/>
            <C:prop name="DTSTART"/>
            <C:prop name="DTEND"/>
            <C:prop name="DURATION"/>
          </C:comp>
        </C:comp>
      </C:calendar-data>
    </D:prop>
    <C:filter>
      <C:comp-filter name="VCALENDAR">
        <C:comp-filter name="VPOLL">
          <C:time-range start="20121204T000000Z"
                        end="20121205T000000Z"/>
        </C:comp-filter>
      </C:comp-filter>
    </C:filter>
  </C:calendar-query>

  >> Response <<

  HTTP/1.1 207 Multi-Status
  Date: Sat, 11 Nov 2012 09:32:12 GMT
  Content-Type: application/xml; charset="utf-8"
  Content-Length: xxxx

  <?xml version="1.0" encoding="utf-8" ?>
  <D:multistatus xmlns:D="DAV:"
             xmlns:C="urn:ietf:params:xml:ns:caldav">
    <D:response>
      <D:href>http://cal.example.com/cyrus/work/poll2.ics</D:href>
      <D:propstat>
        <D:prop>
          <D:getetag>"fffff-abcd2"</D:getetag>
          <C:calendar-data>BEGIN:VCALENDAR
  VERSION:2.0
  BEGIN:VPOLL
  DTSTART;TZID=US/Eastern:20121202T120000
  DURATION:PT4D
  SUMMARY:Poll #2
  UID:00959BC664CA650E933C892C@example.com
  END:VPOLL
  END:VCALENDAR
  </C:calendar-data>
        </D:prop>
        <D:status>HTTP/1.1 200 OK</D:status>
      </D:propstat>
    </D:response>
```

```
  <D:response>
    <D:href>http://cal.example.com/cyrus/work/poll3.ics</D:href>
    <D:propstat>
      <D:prop>
        <D:getetag>"fffff-abcd3"</D:getetag>
        <C:calendar-data>BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//Example Corp.//CalDAV Client//EN
BEGIN:VPOLL
DTSTART;TZID=US/Eastern:20121204T100000
DURATION:PT4D
SUMMARY:Poll #3
UID:DC6C50A017428C5216A2F1CD@example.com
END:VPOLL
END:VCALENDAR
</C:calendar-data>
      </D:prop>
      <D:status>HTTP/1.1 200 OK</D:status>
    </D:propstat>
  </D:response>
</D:multistatus>
```

7.4. CalDAV time ranges

Section 9.9 "CALDAV:time-range XML Element" in [RFC4791] describes how to specify time ranges to limit the set of calendar components returned by the server. This specification extends [RFC4791] to describe the meaning of time ranges for VPOLL

A VPOLL component is said to overlap a given time range if the condition for the corresponding component state specified in the table below is satisfied. The conditions depend on the presence of the DTSTART, DURATION, DTEND, COMPLETED and CREATED properties in the VPOLL component. Note that, as specified above, the DTEND value MUST be a DATE-TIME value equal to or after the DTSTART value if specified.



8. Security Considerations

Applications using these property need to be aware of the risks entailed in using the URIs provided as values. See [RFC3986] for a discussion of the security considerations relating to URIs.

9. IANA Considerations

9.1. Parameter Registrations

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
REQUIRED	Current	RFCXXXX, Section 4.3.1
STAY-INFORMED	Current	RFCXXXX, Section 4.3.2

9.2. Property Registrations

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
ACCEPT-RESPONSE	Current	RFCXXXX, Section 4.4.1
POLL-ITEM-ID	Current	RFCXXXX, Section 4.4.3
POLL-MODE	Current	RFCXXXX, Section 4.4.4
POLL-PROPERTIES	Current	RFCXXXX, Section 4.4.5
POLL-WINNER	Current	RFCXXXX, Section 4.4.6
RESPONSE	Current	RFCXXXX, Section 4.4.8
VOTER	Current	RFCXXXX, Section 4.4.9

9.3. POLL-MODE Registration Template

A poll mode is defined by completing the following template.

Poll mode name: The name of the poll mode.

Purpose: The purpose of the poll mode. Give a short but clear description.

Reference: A reference to the RFC in which the poll mode is defined

9.4. POLL-MODE Registrations

This document defines the following registered poll modes.

Poll mode name	Purpose	Reference
BASIC	To provide simple voting for a single outcome from a number of candidates.	Current

10. Acknowledgements

The authors would like to thank the members of the Calendaring and Scheduling Consortium Freebusy technical committee and the following individuals for contributing their ideas and support:

...

The authors would also like to thank the Calendaring and Scheduling Consortium for advice with this specification.

11. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2434] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 2434, October 1998.

[RFC3688] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688, January 2004.

[RFC3986] Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, January 2005.

[RFC4589] Schulzrinne, H. and H. Tschofenig, "Location Types Registry", RFC 4589, July 2006.

[RFC4791] Daboo, C., Desruisseaux, B., and L. Dusseault, "Calendaring Extensions to WebDAV (CalDAV)", RFC 4791, March 2007.

[RFC4918] Dusseault, L., "HTTP Extensions for Web Distributed Authoring and Versioning (WebDAV)", RFC 4918, June 2007.

[RFC5545] Desruisseaux, B., "Internet Calendaring and Scheduling Core Object Specification (iCalendar)", RFC 5545, September 2009.

[RFC5546] Daboo, C., "iCalendar Transport-Independent Interoperability Protocol (iTIP)", RFC 5546, December 2009.

[RFC6047] Melnikov, A., "iCalendar Message-Based Interoperability Protocol (iMIP)", RFC 6047, December 2010.

[RFC6638] Daboo, C. and B. Desruisseaux, "Scheduling Extensions to CalDAV", RFC 6638, June 2012.

[W3C.REC-xml-20060816] Bray, T., Paoli, J., Sperberg-McQueen, M., Maler, E., and F. Yergeau, "Extensible Markup Language (XML) 1.0 (Fourth Edition)", World Wide Web Consortium Recommendation REC-xml-20060816, August 2006, <http://www.w3.org/TR/2006/REC-xml-20060816>.

Appendix A. Open issues

Notifications: Need to do a section on what Notifications to support.
A. VPOLL is about to end and you haven't voted on it yet. Instead reuse VALARMS to notify the user?

Future: Restarting a confirmed/completed VPOLL What to do with changes to STATUS:CONFIRMED? Allow them or not? What do to that poll had a winning event or todo.
Stress VPOLL UID MUST be unique
Changing status back from CONFIRMED MUST adjust status of any events booked as a result of confirmation.
MUST winning event be cancelled for POLL-MODE basic? No - VOTER has indicated now unable to attend - want to revote

Future: Voting on a confirmed/completed VPOLL Can a VOTER vote after completion? May be unable to attend and wants to indicate.
Requires retention of VPOLL
retention period
Removed status

ORGANIZER/ATTENDEE validity Can a user create a poll with scheduled events where that user's isn't the organizer of the poll? So is there a requirement that the account that poll is on is able to create each one of the resources in the poll? i.e. I can't create a poll with a set of events where I am just the attendee of the

events. Are there any other restrictions for components in a VPOLL?
Add to security consideration

Update to existing event after poll confirm When voting on existing event - winning properties ONLY are merged in to the real event.

Need to write down what isn't valid in a VPOLL
a. Can't change POLL-MODE

Guide for ATTENDEE roles
chair, NON-PARTICIPANT etc

? - some iTIP notes On confirm - send iTIP if appropriate (PUBLISH) - all non-participating - shared - feeds
Organizer can specify where result is?
Confirm can specify that iTIP is sent - iTIP / NONE - parameter ? on POLL-WINNER

Need to add example of freebusy in response

```
BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//BedeworkCaldavTest//BedeworkCaldavTest
METHOD: REPLY
BEGIN:VPOLL
ORGANIZER:mailto:douglm@mysite.edu
VOTER:mailto:eric@example.com
UID:sched01-1234567890
DTSTAMP:20120101T010000Z
SEQUENCE:0
SUMMARY:What to do this week
BEGIN:VFREEBUSY
.......
END:VFREEBUSY
END:VPOLL
END:VCALENDAR
```

Appendix B. Change log

V03: 2014-12-08 MD

- Add VVOTER and VOTE components. Many changes to spec as a result.
- Add RESPONSE property.
- Remove RESPONSE parameter from VOTER.

- Add reply-url property and required parameter.
- Fix ACCEPT-RESPONSE definition.

V02: 2014-05-12 MD

- Typos fixed, clarifications made.
- Removed spurious COMMENT param. Switched some to PUBLIC-COMMENT
- Changed STAY-INFORMED to remove boolean value type and state explicit TRUE/FALSE values.
- iTIP: Allow VPOLL DTSTART to be optional and allow VAVAILABILITY as subcomponent
- iTIP: fix broken table cells
- Add POLL-PROPERTIES, POLL-WINNER to 5545 extensions table
- Added Caldav scheduling section

V01: 2013-08-07 MD

- Removed method CONFIRM
- Removed pollitemid from VPOLL abnf. Added text for pollwinner
- Added POLL-WINNER and verbiage
- Added STATUS values
- Added RELTYPE=POLL
- Added supported-vpoll-component-sets
- Added CalDAV related parameters to VOTER
- Removed bad CalDAV query example. State that queries cannot target the sub-components.

2012-11-02 MD Initial version

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