CalWSSOAP - SOAP Web service protocol for calendaring

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Related Work:

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- https://datatracker.ietf.org/idtracker/draft-daboo-et-al-icalendar-in-xml

Declared XML Namespace(s):

http://docs.oasis-open.org/ns/wscal/calws-soap

Declared Properties and Relations Namespaces

Properties and extended relation types are prefixed with the URL"

http://docs.oasis-open.org/ns/wscal/calwsrel

Abstract:

This document describes a SOAP web service for calendar access and update.

Status:

This document was last revised or approved by the [TC name | membership of OASIS] on the above date. The level of approval is also listed above. Check the "Latest Version" or "Latest Approved Version" location noted above for possible later revisions of this document.

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1 Introduction

The CalWS protocol is built upon and makes the same assumptions about structure as the CalDAV protocol defined in [RFC 4791] and related specifications. It does NOT require nor assume the WebDAV nor CalDAV protocol.

Calendar resources, for example events and tasks are stored as named resources (files) inside special collections (folders) known as "**Calendar Collections**".

This specification can be looked upon as a layer built on top of CalDAV and defines the basic operations which allow creation, retrieval, update and deletion. In addition, query and freebusy operations are defined to allow efficient, partial retrieval of calendar data.

This does not mean that a CalWS service must be built on CalDAV, merely that a degree of conformity is established such that services built in that manner do not have a significant mismatch. It is assumed that some CalWS services will be built without any CalDAV support.

1.1 Terminology

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this specification are to be interpreted as described in IETF RFC 2119 [RFC 2119].

1.2 Normative References

[RFC 2119] S. Bradner. *Key words for use in RFCs to Indicate Requirement Levels*. IETF RFC 2119, March 1997. http://www.ietf.org/rfc/rfc2119.txt.

[RFC 2616] Fielding, et al, *Hypertext Transfer Protocol -- HTTP/1.1*
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[RFC 3339] Klyne g., Newman C., *Date and Time on the Internet: Timestamps*
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http://www.ietf.org/rfc/rfc4790.txt.

[RFC 4791] Daboo, et al. *Calendaring Extensions to WebDAV (CalDAV).*
http://www.ietf.org/rfc/rfc4791.txt.

[draft caldav-sched] Desruisseaux, et al. *CalDAV Scheduling extensions to WebDAV*
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http://tools.ietf.org/html/rfc4918

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[draft-xcal] C. Daboo, M. Douglass, S. Lees *xCal: The XML format for iCalendar*
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http://www.w3.org/TR/2000/NOTE-SOAP-20000508/

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http://tools.ietf.org/html/draft-nottingham-http-link-header

[WS-Addr] W3C Recommendation,Web Services Addressing 1.0 - Core, and Web Services Addressing 1.0 - SOAP Binding, 9 May 2006
http://www.w3.org/2002/ws/addr/

[WT-I-Basic] Basic Profile Version 1.1, 10 April 2006
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[WS-I-Bind] Web Services-Interoperability Organization (WS-I) Simple SOAP Binding Profile Version 1.0, 24 August 2004
http://www.ws-i.org/Profiles/SimpleSoapBindingProfile-1.0-2004-08-24.html

[WSDL11**]** Web Services Description Language (WSDL) 1.1, 15 March 2001
http://www.w3.org/TR/2001/NOTE-wsdl-20010315

1.3 Non-normative References

[Reference] [reference citation]

[Reference] [reference citation]

NOTE: The proper format for a citation to an OASIS Technical Committee's work (whether Normative or Non-Normative) is:

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Stage (Committee Draft 01, Committee Draft 02, Committee Specification 01, etc. or Standard)
Title (italicized or in quotation marks)
Approval Date (Month YYYY)
URI of the actual Authoritative Specification (namespace is not acceptable as the content changes over time)

For example:

[EDXL-HAVE] OASIS Standard, "Emergency Data Exchange Language (EDXL) Hospital AVailability Exchange (HAVE) Version 1.0", November 2008.
http://docs.oasis-open.org/emergency/edxl-have/os/emergency_edxl_have-1.0-spec-os.doc

2 Issues not addressed by this specification.

A number of issues are not addressed by this version of the specification, either because they should be addressed elsewhere or will be addressed at some later date.

2.1 Access Control

It is assumed that the targeted server will set an appropriate level of access based on authentication. This specification will not attempt to address the issues of sharing or ACLs.

2.2 Provisioning

The protocol will not provide any explicit provisioning operations. If it is possible to authenticate or address a principals calendar resources then they MUST be automatically created if necessary or appropriate

2.3 Copy/Move

These operations are not yet defined for this version of the CalWS protocol. Both operations raise a number of issues. In particular implementing a move operation through a series of retrievals, insertions and deletions may cause undesirable side-effects. Both these operations will be defined in a later version of this specification.

2.4 Creating Collections

We will not address the issue of creating collections within the address space. The initial set is created by provisioning.

2.5 Retrieving collections

This operation is currently undefined.

2.6 Setting service and resource properties.

These operations are not defined in this version of the specification. In the future it will be possible to define or set the properties for the service or resources within the service.

3 CalWS Glossary

3.1 Calendar Object Resource

A calendar object resource is an event, meeting or a task. Attachments are resources but NOT calendar object resources. An event or task with overrides is a single calendar resource entity.

3.2 Uid

The UID of an event is defined in [RFC 5545] as a "persistent, globally unique identifier for the calendar component". It is in fact, slightly more complicated in that all overrides to a recurring event have the same UID as the master event. Copies of a meeting invitation sent to attendees must also have the same UID.

In this protocol the UID is the key by which we locate calendar object resources (see above) and any associated overrides within a calendar collection (see below).

3.3 Collections

A collection is a set of resources which may be entities or other collections. In file systems a collection is commonly referred to as a folder. Collections are referred to by a collection id which is specific to a service and may take any form. For many systems they will be path-like.

3.4 Calendar Collection

A collection only allowed to contain calendar object resources. The UIDs for components within a calendar collection must be unique. The combination of a calendar collection id and the UID MUST be a unique key within a set of resources made available through this service.

3.5 Scheduling Calendar Collection

A folder only allowed to contain calendar resources which is also used for scheduling operations. Scheduling events placed in such a collection will trigger implicit scheduling activity on the server.

3.6 Principal Home

The collection under which all the resources for a given principal are stored. For example, for principal "fred" the principal home might be "/user/fred/"

3.7 Change token

This is an opaque token returned to identify the current change status of an entity. Whenever an entity is changed the token will take on a new value. An unchanged token value DOES NOT imply byte-for-byte equality with the stored entity. The service may choose to modify properties under its control, for example last-modification times. However, an entity with an unchanged token can be safely updated by a client holding that token.

4 Overview of the CalWS protocol

CalWs operations and data elements are defined in this specification. Many of the operations result in the transmission of data as defined in [RFC 5545].

SOAP 1.1 messages consist of three elements: an envelope, header data, and a message body. CalWs request-response elements MUST be enclosed within the SOAP message body. CalWs SOAP messages MUST conform to [WT-I-Basic] and [WS-I-Bind]. A single CalWs SOAP message MUST contain only one service request or a single service response).

The basic process for using SOAP for CalWs operations is:

A system entity acting as a CalWs requester transmits a CalWs request element within the body of a SOAP message to a system entity acting as a CalWs responder. The CalWs requester MUST NOT include more than one CalWs request per SOAP message or include any additional XML elements in the SOAP body (though see Section 14for multiple messages packaged in one request).

The CalWs responder MUST return either a CalWs response element within the body of another SOAP message or generate a SOAP fault. The CalWs responder MUST NOT include more than one CalWs response per SOAP message or include any additional XML elements in the SOAP body. If a CalWs responder cannot, for some reason, process a CalWs request, it MUST generate a SOAP fault. (SOAP 1.1 faults and fault codes are discussed in [SOAP11] section 5.1.)

4.1 Discovery

CalWs implementers (service providers) MUST provide a WSDL WSDL11 to describe their implementations. This WSDL MAY or may not be made public via a standard discovery mechanism (such as UDDI) or other method.

In addition, it is REQUIRED that the CalWs implementation include the Properties operation to provide dynamic information regarding CalWs capabilities, options, etc. that are supported.

4.2 Properties

A service or resource will have a number of properties which describe the current state of that service or resource. These properties are accessed through the execution of a properties operation specifying the target resource. See Retrieving Collection and Service Properties below

4.3 Operations

The following operations are defined by this specification:

- Retrieval and update of service and resource properties
- Creation of a calendar object
- Retrieval of a single calendar object
- Multiget of one or more calendar objects
- Update of a calendar object
- Deletion of a calendar object
- Query
- Free-busy query
- Multiple operations

4.4 Calendar Object Resources

The same restrictions apply to Calendar Object Resources as specified in CalDAV [RFC 4791] section 4.2. An additional constraint for CalWS is that no timezone specifications are transferred with the data.

4.5 Timezone information

It is assumed that the client and server each have access to a full set of up to date timezone information. Timezones will be referenced by a timezone identifier from the full set of Olson data together with a set of well-known aliases. CalWS services may advertise a timezone service (which may be the same service acting as a timezone server) through the server properties object. The timezone service operations are defined in [draft-timezones]. The service can provide a list of timezone identifiers and aliases.

4.6 Error conditions

Each operation on the calendar system has a number of pre-conditions and post-conditions that apply. If any of these are violated the response message will have a status code indicating an error occurred and will contain an error response element providing details.

A "precondition" for a method describes the state of the server that must be true for that method to be performed. A "postcondition" of a method describes the state of the server that must be true after that method has been completed. Any violation of these conditions will result in an error response in the message.

Each method specification defines the preconditions that must be satisfied before the method can succeed. A number of postconditions are generally specified which define the state that must exist after the execution of the operation. Preconditions and postconditions are defined as error elements in the CalWS XML namespace.

Example: error with error condition

```
<?xml version="1.0" encoding="utf-8"
      xmlns:CW="http://docs.oasis-open.org/ns/wscal/calws-soap"
      xmlns:C="urn:ietf:params:xml:ns:caldav" ?>
<CW:error>
  <CW:uidConflict>
    <CW:href>/user/mike/calendar/abcd-0123456789.ics</CW:href>
  </CW:uidConflict>
  <CW:description>Unknown property </CW:description>
</CW:error>
```

5 CalWs-SOAP Messages.

This section describes the common elements and structure of CalWs-SOAP messages. The conventions followed are shown in Table 1

Header	Description	Values	Meaning
Field	Name of the field.		Prefixed with / to indicate a child-relationship Prefixed with # to indicate an attribute
Type	XML schema type		
#	Cardinality of the field	1	One occurrence
		0..1	Zero or one occurrence
		0..*	Zero or more occurrences
		1..*	One or more occurrences
?	Presence	Y	Always required
		N	Optional
		C	Conditional - dependent on the message or other conditions
Description	A short description		

Table 1: Field column descriptions

5.1 Common Elements and types

The following tables define the base types for requests and responses. All CalWs-SOAP messages and responses are based on these types.

All requests must include an href which specifies the target for the request. There is also an id attribute which will be copied into the response to help identify it.

Field	Type	#	?	Description
href	string	1	Y	Required in each request to identify the target of the message.
#id	int	1	N	Useful for tying responses to requests.

Table 2: BaseRequestType elements

A response may include an error response element of type ErrorResponseType. This element will be returned in response messages when some form of processing error occurs and provides further information on the error beyond the basic status code.

Field	Type	#	?	Description
?	ErrorCodeType	1	Y	One of the error code elements defined below
description	string	0..1	N	Optional descriptive message

Table 3: ErrorResponseType elements

ErrorCodeType

The following table defines the error codes that may be returned as an element of ErrorCodeType.

Field	Type	Description
forbidden	ForbiddenType	Attempted to carry out a forbidden operation.
targetExists	TargetExistsType	
targetDoesNotExist	TargetDoesNotExistType	The supplied href does not reference an existing resource.
targetNotEntity	TargetNotEntityType	The supplied href does not target an entity. For example a fetch item was attempted against a collection.
notCalendarData	NotCalendarDataType	The supplied entity is not calendar data.
invalidCalendarData	InvalidCalendarDataType	The supplied entity does not represent valid calendar data.
invalidCalendarObjectResource	InvalidCalendarObjectResourceType	The supplied entity does not represent valid calendar data.
unsupportedCalendarComponent	UnsupportedCalendarComponentType	Indicates that the calendar collection does not accept components of the type the client is attempting to store. The accepted component types can be determined by examining the calendar collection properties.
invalidCalendarCollectionLocation	InvalidCalendarCollectionLocationType	Error indicating at least one of two conditions: 1. The server does not allow the creation of calendar collections at the given location in its namespace, or 2. The parent collection of the Request-URI exists but cannot accept members
exceedsMaxResourceSize	ExceedsMaxResourceSizeType	Error indicating that the total size of the event or task is too large. The maximum size is set by the target system and can be determined from the properties.
beforeMinDateTime	BeforeMinDateTimeType	Error indicating that the start or end of an event or task is too far into the past. The minimum date is set by the target system and can be determined from the properties.
afterMaxDateTime	AfterMaxDateTimeType	Error indicating that the start or end of an event or task is too far into the future. The maximum date is set by the target system and can be determined from the properties.
tooManyInstances	TooManyInstancesType	Error indicating that a recurring event has too many instances. The maximum number is set by the target system and can be determined from the properties.
tooManyAttendeesPerInstance	TooManyAttendeesPerInstanceType	Error indicating that a scheduling message has too many attendees. The maximum number is set by the target system and can be determined from the properties.
partialSuccess	PartialSuccessType	Indicates that a MultiOpType operation was partially successful. Returned when the operation is marked as non-atomic and one or more sub-operations failed. The entire response needs to be examined to determine failing operations.

Field	Type	Description
missingChangeToken	MissingChangeTokenType	An operation was attempted which required a change token but none was supplied. Note that it appears that the marshalling or demarshalling should handle this as the token is required. It doesn't.
mismatchedChangeToken	MismatchedChangeTokenType	An update operation was attempted with a change token value which does not match that held by the service. The client must refetch the entity to refresh its cached value and token. Note that matching of tokens is a server responsibility. The token is opaque to the client but probably structured to the server. Certain non-conflicting updates may be allowed even if the token has changed.
invalidFilter	InvalidFilterType	
uidConflict	UidConflictType	An attempt was made to store an entity which would result in more than one entity having equal uids. The entity uid must be unique within a collection. Recurring event or task overrides have the same uid and are considered part of a single entity.

Table 4: ErrorCodeType definitions

BaseResponseType

Field	Type	#	?	Description
#id	int	1	N	Copied over from the request
status	StatusType	1	Y	Give the overall status of the response
message	string	0..1	N	Optional explanatory message
errorResponse	ErrorCodeType	0..1	N	Required for a status of Error.

Table 5: BaseResponseType elements

6 Properties

The getPropertiesReponse message contains 0 or more properties defined below. Some properties apply to the service as a whole while others apply only to the targeted resource. The targeted resource may have property values which override those for the service. For example, the timezone identifier for a particular collection may differ from the default timezone identifier for the system.

Each property is an XML complex type based on the GetPropertiesBasePropertyType.

6.1 childCollection

Provides information about a child collections for the target.

Field	Type	#	?	Description
href	string	1	Y	The URI of the collection.
collection	CollectionType	1	Y	This is a collection
calendarCollection	CalendarCollectionType	0..1	C	If present this is a calendar collection

Table 6: ChildCollectionType fields

See resourceType for descriptions of CollectionType and Calendar CollectionType.

6.2 creationDateTime

This property MAY be returned for the service and SHOULD be returned for any targeted resource.

Field	Type	#	?	Description
dateTime	dateTime	1	Y	A date-time as defined in [RFC 3339] Section 5.6.

Table 7: CreationDateTimeType fields

6.3 displayName

This property SHOULD be returned for any targeted resource.

Field	Type	#	?	Description
string	string	1	Y	The displayable name.

Table 8: DisplayNameType fields

6.4 lastModifiedDateTime

This property MAY be returned for the service and SHOULD be returned for any targeted resource.

Field	Type	#	?	Description
dateTime	dateTime	1	Y	A date-time as defined in [RFC 3339] Section 5.6.

Table 9: LastModifiedDateTimeType fields

6.5 maxAttendeesPerInstance

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource.

Field	Type	#	?	Description
integer	integer	1	Y	The maximum number of attendees allowed per event or task instance.

Table 10: MaxAttendeesPerInstanceType fields

6.6 maxDateTime

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource.

Field	Type	#	?	Description
dateTime	dateTime	1	Y	The maximum date and time for an event.

Table 11: MaxDateTimeType fields

6.7 maxInstances

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource.

Field	Type	#	?	Description
integer	integer	1	Y	The maximum number of instances for a recurring event.

Table 12: MaxInstancesType fields

6.8 maxResourceSize

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource.

Field	Type	#	?	Description
integer	integer	1	Y	An integer value defining the maximum size of a resource in octets that the server is willing to accept when a calendar object resource is stored in a calendar collection.

Table 13: MaxResourceSizeType fields

6.9 minDateTime

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource.

Field	Type	#	?	Description
dateTime	dateTime	1	Y	The minimum date and time for an event.

Table 14: MinDateTimeType fields

6.10 principalHome

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource.

Field	Type	#	?	Description
string	string	1	Y	The home path of the currently authenticated user.

Table 15: PrincipalHomeType fields

6.11 resourceDescription

Provides some descriptive text for the targeted collection.

Field	Type	#	?	Description
string	string	1	Y	The descriptive text.

Table 16: ResourceDescriptionType fields

6.12 resourceOwner

This property SHOULD be returned for any targeted resource.

Field	Type	#	?	Description
string	string	1	Y	The principal URL of the resource owner.

Table 17: ResourceownerType fields

6.13 resourceTimezoneId

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource.

Field	Type	#	?	Description
string	string	1	Y	The timezone identifier.

Table 18: ResourceTimezoneIdType fields

6.14 resourceType

Provides information about a targeted resource.

Field	Type	#	?	Description
href	string	1	Y	The URI of the collection.
collection	CollectionType	0..1	C	If present this is a collection
calendarCollection	CalendarCollectionType	0..1	C	If present this is a calendar collection
inbox	InboxType	0..1	C	If present this is a scheduling inbox
outbox	OutboxType	0..1	C	If present this is a scheduling outbox
inbox	InboxType	0..1	C	If present this is a scheduling inbox
xresource	XresourceType	0..1	C	If present provides further type information.

Table 19: ResourceTypeType fields

All the child types are empty elements with the exception of XresourceType.

Field	Type	#	?	Description
string	string	1	Y	Extra information.

Table 20: XresourceType fields

6.15 supportedCalendarComponentSet

This property identifies which component types the service is prepared to store. The allowable components may be different for different targets on the same service.

Field	Type	#	?	Description
Any valid iCalendar component name	xcal:BaseComponentType	0..n	C	One or more empty iCalendar components.

Table 21: SupportedCalendarComponentSetType fields

6.16 supportedFeatures

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource. The property shows what protocol features are supported by the server.

Field	Type	#	?	Description
calendarAccessFeature	CalendarAccessFeatureType	1	Y	Indicates the service supports this protocol.

Table 22: SupportedFeaturesType fields

6.17 timezoneServer

This property SHOULD be returned for the service and MAY be returned for any targeted collection resource.

Field	Type	#	?	Description
string	string	1	Y	The location of a timezone service used to retrieve timezone information and specifications. This may be an absolute URL referencing some other service or a relative URL if the current server also provides a timezone service.

Table 23: TimezoneServerType fields

6.18 CalWS:privilege-set XML element

http://docs.oasis-open.org/ns/wscal/calws:privilege-set

Appears within a link relation describing collections or entities and specifies the set of privileges allowed to the current authenticated principal for that collection or entity.

```
<!ELEMENT calws:privilege-set (calws:privilege*)>
<!ELEMENT calws:privilege ANY>
```

Each privilege element defines a privilege or access right. The following set is currently defined

- CalWS: Read - current principal has read access
- CalWS: Write - current principal has write access

```
<calWS:privilege-set>
  <calWS:privilege><calWS:read></calWS:privilege>
  <calWS:privilege><calWS:write></calWS:privilege>
</calWS:privilege-set>
```

7 Retrieving Collection and Service Properties

The CalWs-SOAP getProperties request is used to fetch properties. The href can target the service with a path of "/" or any entity within the service.

The service properties define the global limits and defaults. Any properties defined on collections within the service hierarchy override those service defaults. The service may choose to prevent such overriding of defaults and limits when appropriate. The tables below show the fields for request and response.

Field	Type	#	?	Description
href	string	1	Y	Identify the target of the request. "/" for the service.

Table 24: GetPropertiesType fields

Field	Type	#	?	Description
href	string	1	Y	Identify the target of the request. "/" for the service.
?	GetPropertiesBaseProperty Type	0..n	C	0 or more properties of the targeted resource

Table 25: GetPropertiesResponseType fields

7.1 Example - retrieving server properties:

```
>>Request

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:getProperties xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
        xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/</ns2:href>
    </ns2:getProperties>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>>Response

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header />
  <SOAP-ENV:Body>
    <ns2:getPropertiesResponse
      xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
      xmlns:ns4="urn:ietf:params:xml:ns:icalendar-2.0"
      id="0">
      <ns2:href>/</ns2:href>
      <ns2:lastModifiedDateTime>
        <ns2:dateTime>2012-01-04T18:21:14Z</ns2:dateTime>
      </ns2:lastModifiedDateTime>
      <ns2:supportedCalendarComponentSet>
        <ns4:vevent />
        <ns4:vtodo />
        <ns4:vavailability />
      </ns2:supportedCalendarComponentSet>
      <ns2:resourceType>
        <ns2:collection />
      </ns2:resourceType>
      <ns2:supportedFeatures>
        <ns2:calendarAccessFeature />
      </ns2:supportedFeatures>
      <ns2:maxInstances>
        <ns2:integer>1000</ns2:integer>
      </ns2:maxInstances>
      <ns2:maxResourceSize>
        <ns2:integer>100000</ns2:integer>
      </ns2:maxResourceSize>
    </ns2:getPropertiesResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

8 Creating Calendar Object Resources

Creating calendar object resources is carried out by using a CalWs-SOAP addItem request targeted at the parent collection and containing the resource to be created. The response will contain the href of the newly created object.

The icalendar entity in the request MUST contain only a single calendaring entity with any related overrides.

Field	Type	#	?	Description
href	string	1	Y	Identify the target of the request.
icalendar	xcal:IcalendarType	1	Y	The entity to be created

Table 26: AddItemType fields

The service will respond with an AddItemResponseType giving either the href and change token of the new entity or an error response.

Field	Type	#	?	Description
href	string	0..1	N	Href of the new entity for a successful request.
changeToken	string	0..1	N	Change token for the new entity

Table 27: AddItemResponseType additional fields

8.1 Preconditions for Calendar Object Creation

- **CalWS:target-exists**: The entity already exists.
- **CalWS:not-calendar-data:** The resource submitted MUST be a supported media type (i.e., iCalendar) for calendar object resources;
- **CalWS:invalid-calendar-data:** The resource submitted MUST be valid data for the media type being specified (i.e., MUST contain valid iCalendar data);
- **CalWS:invalid-calendar-object-resource:** The resource submitted in the request MUST obey all restrictions specified in Calendar Object Resources (e.g., calendar object resources MUST NOT contain more than one type of calendar component, calendar object resources MUST NOT specify the iCalendar METHOD property, etc.);
- **CalWS:unsupported-calendar-component:** The resource submitted in the request MUST contain a type of calendar component that is supported in the targeted calendar collection;
- **CalWS:uid-conflict:** The resource submitted in the request MUST NOT specify an iCalendar UID property value already in use in the targeted calendar collection or overwrite an existing calendar object resource with one that has a different UID property value. Servers SHOULD report the URL of the resource that is already making use of the same UID property value in the CalWS:href element
  <!ELEMENT uid-conflict (CalWS:href)>
- **CalWS:exceeds-max-resource-size:** The resource submitted in the request MUST have an octet size less than or equal to the value of the CalDAV:max-resource-size property value on the calendar collection where the resource will be stored;
- **CalWS:before-min-date-time:** The resource submitted in the request MUST have all of its iCalendar DATE or DATE-TIME property values (for each recurring instance) greater than or equal to the value of the CalDAV:min- date-time property value on the calendar collection where the resource will be stored;
- **CalWS:after-max-date-time:** The resource submitted in the request MUST have all of its iCalendar DATE or DATE-TIME property values (for each recurring instance) less than the value of the CalDAV:max-date-time property value on the calendar collection where the resource will be stored;

- **CalWS:too-many-instances:** The resource submitted in the request MUST generate a number of recurring instances less than or equal to the value of the CalDAV: max-instances property value on the calendar collection where the resource will be stored;
- **CalWS:too-many-attendees-per-instance:** The resource submitted in the request MUST have a number of ATTENDEE properties on any one instance less than or equal to the value of the CalDAV:max-attendees-per-instance property value on the calendar collection where the resource will be stored;

8.2 Example - successful addItem:

```
>>Request

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:addItem xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                 xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/user/douglm/calendar</ns2:href>
      <ns3:icalendar>
        <ns3:vcalendar>
          <ns3:components>
            <ns3:vevent>
              <ns3:properties>
                <ns3:uid>
                  <ns3:text>1302064354993</ns3:text>
                </ns3:uid>
                <ns3:summary>
                  <ns3:text>try this</ns3:text>
                </ns3:summary>
                <ns3:dtstart>
                  <ns3:date-time>20110406T150000Z</ns3:date-time>
                </ns3:dtstart>
                <ns3:dtend>
                  <ns3:date-time>20110406T160000Z</ns3:date-time>
                </ns3:dtend>
              </ns3:properties>
            </ns3:vevent>
          </ns3:components>
        </ns3:vcalendar>
      </ns3:icalendar>
    </ns2:addItem>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>>Response

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:addItemResponse xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                         xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:status>OK</ns2:status>
      <ns2:href>/user/douglm/calendar/1302064354993.ics</ns2:href>
      <ns2:changeToken>"20110406T155741Z-0"</ns2:changeToken>
    </ns2:addItemResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

8.3 Example - unsuccessful addItem:

```
   TBD
```

9 Retrieving resources

Fetching calendar object resources is carried out by using a CalWs-SOAP fetchItem request with an href specifying the entity to be fetched. The response will contain the calendaring entity with any related overrides.

Field	Type	#	?	Description
href	string	1	Y	Identify the target of the request.

Table 28: FetchItemType fields

The service will respond with a FetchItemResponseType containing either the change token, its href and the entity or an error response.

Field	Type	#	?	Description
changeToken	string	0..1	N	The change token for the fetched entity
href	string	1	Y	Identify the entity.
icalendar	xcal:IcalendarType	0..1	N	The fetched entity

Table 29: FetchItemResponseType additional fields

9.1 Example - successful fetchItem:

```
>>Request

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:fetchItem xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                   xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/user/douglm/calendar/1302105461170.ics</ns2:href>
    </ns2:fetchItem>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>>Response

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:fetchItemResponse xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                           xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:status>OK</ns2:status>
      <ns2:changeToken>"20110406T155741Z-0"</ns2:changeToken>
      <ns2:href>/user/douglm/calendar/1302105461170.ics</ns2:href>
      <ns3:icalendar>
        <ns3:vcalendar>
          <ns3:properties>
            <ns3:prodid>
              <ns3:text>//Bedework.org//BedeWork V3.7//EN</ns3:text>
            </ns3:prodid>
            <ns3:version>
              <ns3:text>2.0</ns3:text>
            </ns3:version>
          </ns3:properties>
          <ns3:components>
            <ns3:vevent>
              <ns3:properties>
```

```
                <ns3:created>
                  <ns3:utc-date-time>20110406T155741Z</ns3:utc-date-time>
                </ns3:created>
                <ns3:dtend>
                  <ns3:date-time>20110406T160000Z</ns3:date-time>
                </ns3:dtend>
                <ns3:dtstamp>
                  <ns3:utc-date-time>20110406T155741Z</ns3:utc-date-time>
                </ns3:dtstamp>
                <ns3:dtstart>
                  <ns3:date-time>20110406T150000Z</ns3:date-time>
                </ns3:dtstart>
                <ns3:last-modified>
                  <ns3:utc-date-time>20110406T155741Z</ns3:utc-date-time>
                </ns3:last-modified>
                <ns3:summary>
                  <ns3:text>try this</ns3:text>
                </ns3:summary>
                <ns3:uid>
                  <ns3:text>1302105461170</ns3:text>
                </ns3:uid>
              </ns3:properties>
            </ns3:vevent>
          </ns3:components>
        </ns3:vcalendar>
      </ns3:icalendar>
    </ns2:fetchItemResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

9.2 Example - unsuccessful fetchItem:

```
>>Request

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:fetchItem xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                   xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/user/douglm/calendar/nosuchevent.ics</ns2:href>
    </ns2:fetchItem>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>>Response

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:fetchItemResponse xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                           xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:status>Error</ns2:status>
      <ns2:errorResponse>
        <ns2:targetDoesNotExist/>
      </ns2:errorResponse>
    </ns2:fetchItemResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

10 Updating resources

Calendar entity updates apply changes to a data model which has the form:

- An iCalendar element contains...
- a single vCalendar element which contains...
- one or more calendaring components, event, task etc each of which contain...
- zero or more components, alarms etc or one or more properties each of which contains...
- zero or more parameters and one or more values.

Thus we have a nested structure which does recurse to a limited extent and looks like

```
      <icalendar>
        <vcalendar>
          <components>
            <vevent>
              <properties>
                <uid>
                  <text>1302064354993-a</text>
                </uid>
                <summary>
                  <text>try this</text>
                </summary>
                <dtstart>
                  <date-time>2011-07-18T15:00:00Z</date-time>
                </dtstart>
                <dtend>
                  <date-time>2011-07-18T16:00:00Z</date-time>
                </dtend>
              </properties>
            </vevent>
          </components>
        </vcalendar>
      </icalendar>
```

The update approach described here only allows for updating a single calendar entity, though that entity may consist of more than one component, for example an override to a repeating event.

Resources are updated with the CalWs-SOAP updateItem request. The request contains the href of the entity to be updated, the current change token for that entity and the updates. The updates take the form of nested selections of an element from the current level in the data. The outermost selection is always for a vcalendar element - we ignore the icalendar element. Nested within that outer selection is one for the components element followed by selections on the entity, event, task etc and so on.

Only 3 kinds of update may be applied at any point:

- Remove - components, properties or parameters
- Add - components, properties or parameters
- Change - property or parameter values

Removals MUST be processed ahead of additions

Preconditions as specified in Preconditions for Calendar Object Creation are applicable. The response will indicate success or failure of the update. If the change token value does not match that held by the service a mismatchedChangeToken error status will be returned. The client should re-fetch the entity to refresh its cache and then retry the update based on the new entity values and change token.

Field	Type	#	?	Description
href	string	1	Y	Identify the target of the request.
changeToken	string	1	Y	The change token held by the client for that entity
select	ComponentSelectionType	1..*	Y	Must select vcalendar

Table 30: UpdateItemType fields

The ComponentsSelectionType contains three repeating child elements. The first allows for selection of nested components which can then be updated. The next allows addition of entire components and the last allows for the removal of components.

Field	Type	#	?	Description
component	ComponentSelectionType	0..1	N	Used to match against a component in the target
remove	ComponentReferenceType	0..1	N	Supplies components to remove
add	ComponentReferenceType	0..1	N	Species components to add

Table 31: ComponentsSelectionType fields

The PropertiesSelectionType follows the same pattern, selecting properties to update, add or remove.

Field	Type	#	?	Description
property	PropertySelectionType	0..1	N	Used to match against a property in the target
remove	PropertyReferenceType	0..1	N	Supplies properties to remove
add	PropertyReferenceType	0..1	N	Species properties to add

Table 32: PropertiesSelectionType fields

To complete that pattern there is also a ParametersSelectionType used to select property parameters for update or removal and to supply new parameters.

Field	Type	#	?	Description
parameter	ParameterSelectionType	0..1	N	Used to match against a parameter in the target
remove	ParameterReferenceType	0..1	N	Supplies parameters to remove
add	ParameterReferenceType	0..1	N	Species parameters to add

Table 33: ParametersSelectionType fields

Each of these refers to a reference type. These either provide a complete entity for addition or identify the entity for removal. The three reference types are:

Field	Type	#	?	Description
Any valid iCalendar component name	xcal:BaseComponentType	1	Y	Either a complete component or sufficient to identify it.

Table 34: ComponentReferenceType fields

Field	Type	#	?	Description
Any valid iCalendar property name	xcal:BasePropertyType	1	Y	Either a complete property or sufficient to identify it or provide a new value, depending on usage.

Table 35: PropertyReferenceType fields

Field	Type	#	?	Description
Any valid iCalendar parameter name	xcal:BaseParameterType	1	Y	Either a complete parameter or sufficient to identify it or provide a new value, depending on usage.

Table 36: ParameterReferenceType fields

To complete the picture we have three selection types for component, property and parameter. Each of these identifies the entity to be updated, possible selections of the sub-elements and a possible change to values.

ComponentSelectionType contains three child elements. The first is any valid icalendar component element which is to be matched at the current level.

The optional properties selection allows selection and possible updates to the properties of the component. An iCalendar properties element cannot take a value so the only updates possible are addition and removal of properties. Nested properties may be selected for updates.

The optional components selection allows selection and possible updates to the nested icalendar components element of the component. An iCalendar components element cannot take a value so the only updates possible are addition and removal of components. Nested components may be selected for updates.

Field	Type	#	?	Description
Any valid iCalendar component name	xcal:VcalendarType xcal:BaseComponentType	1	Y	Used to match against an element in the target
properties	PropertiesSelectionType	0..1	N	To match the properties element
components	ComponentsSelectionType	0..1	N	To match the components element

Table 37: ComponentSelectionType fields

PropertySelectionType contains three child elements. The first is any valid icalendar property element which is to be matched at the current level.

The optional parameters selection allows selection and possible updates to the parameters of the property.

The optional change element allows a change to the value of the property. The new value is specified by supplying an iCalendar property with the desired value(s). Any parameters will be ignored.

Field	Type	#	?	Description
Any valid iCalendar property name	xcal:BasePropertyType	1	Y	Used to match against an element in the target
parameters	ParametersSelectionType	0..1	N	To match the parameters element
change	PropertyReferenceType	0..1	N	To provide a new value

Table 38: PropertySelectionType fields

Lastly, there is the ParameterSelectionType which contains two child elements. The first is any valid icalendar parameter element which is to be matched at the current level.

The optional change element allows a change to the value of the parameter. The new value is specified by supplying an iCalendar parameter with the desired value(s).

Field	Type	#	?	Description
Any valid iCalendar parameter name	xcal:BaseParameter Type	1	Y	Used to match against an element in the target
change	ParameterReferenceType	0..1	N	To provide a new value

Table 39: ParameterSelectionType fields

For a successful update the service will respond with a UpdateItemResponseType containing the status and the new change token.

Field	Type	#	?	Description
changeToken	string	0..1	N	The new change token for the updated entity

Table 40: UpdateItemResponseType additional fields

The change token value should be used to replace the value held by the client.

10.1 Change tokens and concurrent updates

The change token is used to allow a service to determine whether or not it is safe to carry out an update requested by the client. The change token should be opaque to the client but will probably in fact be a structured value. Calendaring transactions have some special characteristics which make it desirable to allow certain non-conflicting updates to take place while other changes are taking place. For example, meeting requests with a large number of attendees can be frequently updated by the server as a result of attendee participation status changes. If we use an unstructured change token to represent all changes this can make it very difficult to update an event while those participation status changes are being made.

If, on the other hand, the token has a section indicating that only participation status changes have been made, then other changes can take place. For a reference on implementing such a token see "Avoiding Conflicts when Updating Scheduling Object Resources" in [draft caldav-sched]. This describes the use of a schedule-tag.

10.2 Example - successful update:

The event to be updated is represented by the following XML.

```
      <ns3:icalendar>
        <ns3:vcalendar>
          <ns3:components>
            <ns3:vevent>
              <ns3:properties>
                <ns3:uid>
                  <ns3:text>1302064354993-a</ns3:text>
                </ns3:uid>
                <ns3:summary>
                  <ns3:text>try this</ns3:text>
                </ns3:summary>
                <ns3:dtstart>
                  <ns3:date-time>2011-07-18T15:00:00Z</ns3:date-time>
                </ns3:dtstart>
                <ns3:dtend>
                  <ns3:date-time>2011-07-18T16:00:00Z</ns3:date-time>
                </ns3:dtend>
              </ns3:properties>
            </ns3:vevent>
          </ns3:components>
        </ns3:vcalendar>
      </ns3:icalendar>
```

In the following example we make the following changes to the above event:

- Change the summary
- Change the dtstart - add a tzid and change the value to local time
- Add some categories

We first select an event by specifying the uid value and then, from that event, we select the properties, then select and change the appropriate properties.

```
>>Request

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:updateItem xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                    xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/user/douglm/calendar/1302064354993-a.ics</ns2:href>
      <ns2:changeToken>"20110802T032608Z-0"  null</ns2:changeToken>
      <ns2:select>
        <ns3:vcalendar/>
        <ns2:components>
          <ns2:component>
            <ns3:vevent>
              <ns3:properties>
                <ns3:uid>
                  <ns3:text>1302064354993-a</ns3:text>
                </ns3:uid>
              </ns3:properties>
            </ns3:vevent>
            <ns2:properties>
              <ns2:property>
                <ns3:dtstart>
                  <ns3:date-time>2011-07-18T15:00:00Z</ns3:date-time>
                </ns3:dtstart>
                <ns2:parameters>
                  <ns2:add>
                    <ns3:tzid>
                      <ns3:text>America/New_York</ns3:text>
                    </ns3:tzid>
                  </ns2:add>
                </ns2:parameters>
                <ns2:change>
                  <ns3:dtstart>
                    <ns3:date-time>2011-07-18T11:00:00</ns3:date-time>
                  </ns3:dtstart>
                </ns2:change>
              </ns2:property>
              <ns2:property>
                <ns3:summary>
                  <ns3:text>try this</ns3:text>
                </ns3:summary>
                <ns2:change>
                  <ns3:summary>
                    <ns3:text>A changed summary - again and again and again</ns3:text>
                  </ns3:summary>
                </ns2:change>
              </ns2:property>
              <ns2:add>
                <ns3:categories>
                  <ns3:text>newcategory-2</ns3:text>
                  <ns3:text>resources</ns3:text>
                  <ns3:text>paper</ns3:text>
                </ns3:categories>
              </ns2:add>
            </ns2:properties>
          </ns2:component>
        </ns2:components>
      </ns2:select>
    </ns2:updateItem>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>>Response

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:updateItemResponse xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                            xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0"
                            id="0">
      <ns2:status>OK</ns2:status>
    </ns2:updateItemResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

10.3 Other updates:

Based on the example above we present some XML fragments for different kinds of update. These include:

- Addition of properties
- Removal of properties
- Addition of parameters to properties
- Removal of parameters from properties
- Changing parameter values.

The examples all start with the selection of the vevent properties element. First we have the XML for the addition of a tzid to the start date/time. Here we select the dtstart, then the parameters element then add a tzid parameter and change the value of the date and time

```
            <ns2:properties>
              <ns2:property>
                <ns3:dtstart>
                  <ns3:date-time>2011-07-18T15:00:00Z</ns3:date-time>
                </ns3:dtstart>
                <ns2:parameters>
                  <ns2:add>
                    <ns3:tzid>
                      <ns3:text>America/New_York</ns3:text>
                    </ns3:tzid>
                  </ns2:add>
                </ns2:parameters>
                <ns2:change>
                  <ns3:dtstart>
                    <ns3:date-time>2011-07-18T11:00:00</ns3:date-time>
                  </ns3:dtstart>
                </ns2:change>
              </ns2:property>
            </ns2:properties>
```

In this example we add two categories to the event.

```
            <ns2:properties>
              <ns2:add>
                <ns3:categories>
                  <ns3:text>paper</ns3:text>
                </ns3:categories>
              </ns2:add>
              <ns2:add>
                <ns3:categories>
                  <ns3:text>resources</ns3:text>
                </ns3:categories>
              </ns2:add>
            </ns2:properties>
```

In this example we add a duration and remove the dtend.

```
            <ns2:properties>
              <ns2:remove>
                <ns3:dtend>
                  <ns3:date-time>2011-07-18T16:00:00Z</ns3:date-time>
                </ns3:dtend>
              </ns2:remove>
              <ns2:add>
                <ns3:duration>
                  <ns3:duration>PT1H</ns3:duration>
                </ns3:duration>
              </ns2:add>
            </ns2:properties>
```

In this example we change the dtstart timezone identifier.

```
            <ns2:properties>
              <ns2:property>
                <ns3:dtstart>
                  <ns3:parameters>
                    <ns3:tzid>
                      <ns3:text>America/New_York</ns3:text>
                    </ns3:tzid>
                  </ns3:parameters>
                  <ns3:date-time>2011-07-18T11:00:00</ns3:date-time>
                </ns3:dtstart>
                <ns2:parameters>
                  <ns2:parameter>
                    <ns3:tzid>
                      <ns3:text>America/New_York</ns3:text>
                    </ns3:tzid>
                    <ns2:change>
                      <ns3:tzid>
                        <ns3:text>America/Montreal</ns3:text>
                      </ns3:tzid>
                    </ns2:change>
                  </ns2:parameter>
                </ns2:parameters>
              </ns2:property>
            </ns2:properties>
```

10.4 Creating an update message.

The update can be created in many ways but the most common approach is to build the update while modifications take place or to create one as the result of comparing old and new versions. It appears that comparing XML for differences is difficult. However, we can take advantage of the structure of calendaring entities to simplify the process. There are implementations available which take the diff approach to producing an update stream.

There are some special cases to consider when comparing. Some properties are multi-valued and may themselves appear more than once. There is no semantic information implied by any grouping though parameters may need to be taken into account. These properties need to be normalized before comparison and when updating them we produce a change which treats each value as a single property.

These properties are

- categories
- exdate
- freebusy
- rdate

This normalization can take place before comparison.

Some properties are multi-valued and may only appear once. At the moment the only standard property is resource which may take a comma separated list. This should be treated as a single multi-valued property when comparing. The order is unimportant. Sorting the values may help.

Some properties may appear multiple times, for example comment. Comparison should take account of parameters. Ordering all properties appropriately allows for relatively simple comparison.

11 Deletion of resources

Deletion of calendar object resources is carried out by using a CalWs-SOAP deleteItem request with an href specifying the entity to be deleted. The deleteItem request is not valid when the href specifies a collection.

Field	Type	#	?	Description
href	string	1	Y	Identify the target of the request.

Table 41: DeleteItemType fields

The service will respond with a DeleteItemResponseType containing the status and a possible error response. There are no additional elements.

11.1 Example - successful deleteItem:

```
>>Request

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:deleteItem xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                    xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/user/douglm/calendar/1302620814655.ics</ns2:href>
    </ns2:deleteItem>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>>Response

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:deleteItemResponse xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                            xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:status>OK</ns2:status>
    </ns2:deleteItemResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

11.2 Example - unsuccessful deleteItem:

```
>>Request

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:deleteItem xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                    xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/user/douglm/calendar/nosuchevent.ics</ns2:href>
    </ns2:deleteItem>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>>Response

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
```

```
    <ns2:deleteItemResponse xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                            xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:status>Error</ns2:status>
      <ns2:errorResponse>
        <ns2:targetDoesNotExist/>
      </ns2:errorResponse>
    </ns2:deleteItemResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

12 Querying calendar resources

Querying provides a mechanism by which information can be obtained from the service through possibly complex queries. A skeleton icalendar entity can be provided to limit the amount of information returned to the client. A query takes the parts

- Limitations on the data returned
- Selection of the data
- Optional timezone id for floating time calculations.

12.1 Calendar Query common types

The UTCTimeRangeType is used in a number of places to define a time range within which components must appear or property values must lie. The values are UTC time-date, the start is inclusive and the end is exclusive.

Field	Type	#	?	Description
start	UTC date-time	1	Y	UTC inclusive start
end	UTC date-time	1	Y	UTC exclusive end

Table 42: UTCTimeRangeType elements

The TextMatchType is used to match text values in properties and parameters. The collation attribute species a collation as defined in [RFC 4790].

Servers are REQUIRED to support the "i;ascii-casemap" and "i;octet" collations which provide a basic case insensitive and case sensitive match respectively.

Elements of this type take a string value which is matched according to the attributes.

Field	Type	#	?	Description
#collation	String	0..1	N	Collation name from [RFC 4790]. "
#negate-condition	boolean	0..1	N	if "true" negates the condition

Table 43: TextMatchType attributes

12.2 CompFilterType

This type defines a search query for the calendar query operation. It specifies the component types to return, absence tests or basic matching operations on properties and time ranges.

The top level comp-filter element (which must match a vcalendar component may contain zero or more comp-filter elements to match events, tasks or other contained components. These in turn may contain further nested comp-filter elements to match further levels of nested components.

Each may also contain prop-filter elements to test for the absence of properties or to match values.

Only logical conjunctions are supported, that is, all elements of a comp-filter must match for the expression to match.

Field	Type	#	?	Description
anyComp	AnyCompType	0..1	C	One of anyComp, vcalendar or a BaseComponentType must be supplied. anyComp indicates that any component will match.
xcal:vcalendar	xcal:VcalendarType	0..1	C	Matches vcalendar at the top level. Must be provided
xcal:baseComponent	xcal:BaseComponentType	0..1	C	May be vevent or vtodo for example.
#test	String	0..1	N	"anyof" is a logical OR of the child elements. "allof" is a logical AND of the child elements.
is-not-defined	empty	0..1	N	Only this element or one or more of time-range, prop-filter or comp-filter may be present
time-range	UTCTimeRangeType	0..1	N	
comp-filter	CompFilterType	1	Y	Match against contained components
prop-filter	PropFilterType	0..n	N	Match against component properties

Table 44: CompFilterType elements

12.3 PropFilterType

The prop-filter element may test for the absence of a property or match values or specify zero or more ParamFilterType elements to match against parameters.

Only logical conjunctions are supported, that is, all elements must match for the full expression to match.

Field	Type	#	?	Description
xcal:baseProperty	xcal:BasePropertyType	1	Y	Specifies the property to be matched.
#test	String	0..1	N	"anyof" is a logical OR of the child elements. "allof" is a logical AND of the child elements.
is-not-defined	empty	0..1	N	Only this element or optionally one of time-range or text-match followed by param-filter
time-range	UTCTimeRangeType	0..1	N	
text-match	TextMatchtype	0..1	N	
param-filter	ParamFilterType	0..n	N	Match against property parameters

Table 45: PropFilterType elements

12.4 ParamFilterType

The ParamFilterType element may test for the absence of a parameter or match a value.

Field	Type	#	?	Description
xcal:baseParameter	xcal:BaseParameterType	1	Y	Specifies the parameter to be matched.
is-not-defined	empty	0..1	N	Only this element or text-match
text-match	TextMatchtype	0..1	N	

Table 46: ParamFilterType elements

12.5 CalendarQueryType elements

Field	Type	#	?	Description
href	string	1	Y	Identify the target of the request. "/" for the service.
allprop	empty	0..1	N	If present specifies all properties should be returned One or none of allprop or icalendar
xcal:icalendar	xcal:IcalendarType	0..1	N	If present is a valueless icalendar skeleton entity defining which components and properties should be returned. If present allprop must NOT be present.
expand	ExpandType	0..1	N	A subclass of UTCTimeRangeType. Either expand or limitRecurrenceSet may be specified but not both. If specified recurring events are expanded and limited to the supplied time-range. All events times are converted to UTC. This option allows for simplified event handling for certain classes of client.
limitRecurrenceSet	LimitRecurrenceSetType	0..1	N	A subclass of UTCTimeRangeType. Either expand or limitRecurrenceSet may be specified but not both. If specified only overrides that fall within the specified time-range are returned. This helps to limit the size of the result-set when there are many overrides.
depth	String	0..1	N	Species depth for query. "1" => just targeted collection, "infinity" => query targeted and all sub-collections.
filter	FilterType	1	Y	Defines the search filter
/comp-filter	CompFilterType	1	Y	Defines the top-level component

Table 47: CalendarQueryType elements

12.6 Specifying data to be returned

This is achieved by specifying one of the following

- allprop: return all properties and calendar data. (some properties are specified as not being part of the allprop set so are not returned)
- Set the icalendar element. This is an icalendar valueless pattern entity which provides a map of the components and properties to be returned. Neither the pattern nor the returned result need to be valid icalendar entities in that required properties may be absent if unselected.

12.7 Pre/postconditions for calendar queries

The preconditions as defined in [RFC 4791] Section 7.8 apply here. CalDav errors may be reported by the service when preconditions or postconditions are violated.

12.8 Time range limited queries.

Time-range limited retrieval has some special characteristics. The simplest case is a single event or task which overlaps the requested time-period. Recurring items and other components such as alarms complicate the picture.

12.9 Example: time range limited retrieval

This example shows the time-range limited retrieval from a calendar which results in 2 events, one a recurring event and one a simple non-recurring event.

```
>> Request <<

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:calendarQuery xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                       xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/user/douglm/calendar</ns2:href>
      <ns3:icalendar>
        <ns3:vcalendar>
          <ns3:components>
            <ns3:vevent>
              <ns3:properties>
                <ns3:summary/>
                <ns3:dtstart/>
                <ns3:dtend/>
                <ns3:duration/>
                <ns3:uid/>
                <ns3:recurrence-id/>
                <ns3:rrule/>
                <ns3:rdate/>
                <ns3:exdate/>
              </ns3:properties>
            </ns3:vevent>
          </ns3:components>
        </ns3:vcalendar>
      </ns3:icalendar>
      <ns2:filter>
        <ns2:compFilter test="anyof">
          <ns3:vcalendar />
          <ns2:compFilter>
            <ns3:vevent />
            <ns2:time-range end="20110430T040000Z" start="20110401T040000Z"/>
          </ns2:compFilter>
      </ns2:filter>
    </ns2:calendarQuery>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>> Response <<

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:calendarQueryResponse
                       xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
                       xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:status>OK</ns2:status>
      <ns2:response>
        <ns2:href>/user/douglm/calendar/1302105461170.ics</ns2:href>
        <ns2:changeToken>"20110406T155741Z-0"</ns2:changeToken>
        <ns2:propstat>
          <ns2:prop>
            <ns2:calendar-data content-type="application/xml+calendar" version="2.0">
              <ns3:icalendar>
                <ns3:vcalendar>
                  <ns3:properties>
                    <ns3:prodid>
                      <ns3:text>//Bedework.org//BedeWork V3.7//EN</ns3:text>
                    </ns3:prodid>
                    <ns3:version>
                      <ns3:text>2.0</ns3:text>
                    </ns3:version>
                  </ns3:properties>
                  <ns3:components>
                    <ns3:vevent>
                      <ns3:properties>
                        <ns3:dtend>
                          <ns3:date-time>20110406T160000Z</ns3:date-time>
                        </ns3:dtend>
                        <ns3:dtstart>
                          <ns3:date-time>20110406T150000Z</ns3:date-time>
                        </ns3:dtstart>
                        <ns3:summary>
                          <ns3:text>try this</ns3:text>
                        </ns3:summary>
                        <ns3:uid>
                          <ns3:text>1302105461170</ns3:text>
                        </ns3:uid>
                      </ns3:properties>
                    </ns3:vevent>
                  </ns3:components>
                </ns3:vcalendar>
              </ns3:icalendar>
            </ns2:calendar-data>
          </ns2:prop>
          <ns2:status>OK</ns2:status>
        </ns2:propstat>
      </ns2:response>
      <ns2:response>
        <ns2:href>/user/douglm/calendar/CAL-00f1fc61-2f021bca-012f-022947f8-
00000006.ics</ns2:href>
        <ns2:changeToken>"20110405T140920Z-0"</ns2:changeToken>
        <ns2:propstat>
          <ns2:prop>
            <ns2:calendar-data content-type="application/xml+calendar" version="2.0">
              <ns3:icalendar>
                <ns3:vcalendar>
                  <ns3:properties>
                    <ns3:prodid>
                      <ns3:text>//Bedework.org//BedeWork V3.7//EN</ns3:text>
                    </ns3:prodid>
                    <ns3:version>
                      <ns3:text>2.0</ns3:text>
                    </ns3:version>
                  </ns3:properties>
                  <ns3:components>
                    <ns3:vevent>
                      <ns3:properties>
                        <ns3:duration>
                          <ns3:duration>PT1H</ns3:duration>
                        </ns3:duration>
                        <ns3:dtstart>
                          <ns3:parameters>
                            <ns3:tzid>
                              <ns3:text>America/New_York</ns3:text>
                            </ns3:tzid>
                          </ns3:parameters>
                          <ns3:date-time>20110412T110000</ns3:date-time>
                        </ns3:dtstart>
                        <ns3:summary>
                          <ns3:text>Test recurring event</ns3:text>
                        </ns3:summary>
                        <ns3:uid>
                          <ns3:text>CAL-00f1fc61-2f021bca-012f-022947f8-
00000006demobedework@mysite.edu</ns3:text>
                        </ns3:uid>
                        <ns3:rrule>
                          <ns3:recur>
                            <ns3:freq>WEEKLY</ns3:freq>
                            <ns3:count>2</ns3:count>
                            <ns3:interval>1</ns3:interval>
                          </ns3:recur>
                        </ns3:rrule>
                      </ns3:properties>
                    </ns3:vevent>
                    <ns3:vevent>
                      <ns3:properties>
                        <ns3:recurrence-id>
                          <ns3:parameters>
                            <ns3:tzid>
                              <ns3:text>America/New_York</ns3:text>
                            </ns3:tzid>
                          </ns3:parameters>
                          <ns3:date-time>20110419T150000Z</ns3:date-time>
                        </ns3:recurrence-id>
                        <ns3:duration>
                          <ns3:duration>PT1H</ns3:duration>
                        </ns3:duration>
                        <ns3:dtstart>
                          <ns3:parameters>
                            <ns3:tzid>
                              <ns3:text>America/New_York</ns3:text>
                            </ns3:tzid>
                          </ns3:parameters>
                          <ns3:date-time>20110419T120000</ns3:date-time>
                        </ns3:dtstart>
                        <ns3:summary>
                          <ns3:text>Test recurring event</ns3:text>
                        </ns3:summary>
                        <ns3:uid>
                          <ns3:text>CAL-00f1fc61-2f021bca-012f-022947f8-
00000006demobedework@mysite.edu</ns3:text>
                        </ns3:uid>
                      </ns3:properties>
                    </ns3:vevent>
                  </ns3:components>
                </ns3:vcalendar>
              </ns3:icalendar>
            </ns2:calendar-data>
          </ns2:prop>
          <ns2:status>OK</ns2:status>
        </ns2:propstat>
      </ns2:response>
    </ns2:calendarQueryResponse>
```

```
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

13 Free-busy queries

Freebusy queries are used to obtain freebusy information for a principal. The result contains information only for events to which the current principal has sufficient access and may be affected by components and rules available only to the server (for instance office hours availability).

These queries are carried out by using a CalWs-SOAP freebusyReport request with an href specifying a principal. The freebusyReport request is not valid when the href specifies any entity other than a principal.

The query follows the specification defined in [FreeBusy Read URL] with certain limitations. As an authenticated user to the CalWS service scheduling read-freebusy privileges must have been granted. As an unauthenticated user equivalent access must have been granted to unauthenticated users.

Freebusy information is returned by default as xcalendar vfreebusy components, as defined by [draft-xcal]. Such a component is not meant to conform to the requirements of VFREEBUSY components in [RFC 5546]. The VFREEBUSY component SHOULD conform to section "4.6.4 Free/Busy Component" of [RFC 5545]. A client SHOULD ignore the ORGANIZER field.

Since a Freebusy query can only refer to a single user, a client will already know how to match the result component to a user. A server MUST only return a single vfreebusy component.

13.1 Element values

Three values are provided: href; start; end. Only the hre is required. The start and end are in XML UTC date/time format and are interpreted as follows:

start

Default: If omitted the default value is left up to the server. It may be the current day, start of the current month, etc.

Description: Specifies the start date for the Freebusy data. The server is free to ignore this value and return data in any time range. The client must check the data for the returned time range.

Format: An XML UTC date-time

Example:

```
2011-12-01T10:15:00Z
```

Notes: Specifying only a start date/time without specifying an end-date/time or period should be interpreted as in [RFC 5545]. The effective period should cover the remainder of that day.

end

Default: Same as start

Description: Specifies the end date for the Freebusy data. The server is free to ignore this value.

Format: Same as start

Example: Same as start

The server is free to ignore the start, end and period parameters. It is recommended that the server return at least 6 weeks of data from the current day.

A client MUST check the time range in the response as a server may return a different time range than the requested range.

13.2 Examples

The following is an unsuccessful request targeting an invalid resource.

```
>> Request <<

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:freebusyReport
           xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
           xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/user/douglm/calendar</ns2:href>
      <ns2:time-range>
        <ns2:start>2011-04-01T04:00:00Z</ns2:start>
        <ns2:end>2011-04-30T04:00:00Z</ns2:end>
      </ns2:time-range>
    </ns2:freebusyReport>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>> Response <<

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:freebusyReportResponse
            xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
            xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:status>Error</ns2:status>
      <ns2:message>Only principal href supported</ns2:message>
    </ns2:freebusyReportResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

The following is an example of a request to retrieve Freebusy data for a user:

```
>> Request <<

<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:freebusyReport
           xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
           xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:href>/principals/users/douglm</ns2:href>
      <ns2:time-range>
        <ns2:start>2011-04-01T04:00:00Z</ns2:start>
        <ns2:end>2011-04-30T04:00:00Z</ns2:end>
      </ns2:time-range>
    </ns2:freebusyReport>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

>> Response <<

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:freebusyReportResponse
            xmlns:ns2="http://docs.oasis-open.org/ns/wscal/calws-soap"
            xmlns:ns3="urn:ietf:params:xml:ns:icalendar-2.0">
      <ns2:status>OK</ns2:status>
      <ns3:icalendar>
        <ns3:vcalendar>
          <ns3:properties>
            <ns3:prodid>
```

```
              <ns3:text>//Bedework.org//BedeWork V3.7//EN</ns3:text>
            </ns3:prodid>
            <ns3:version>
              <ns3:text>2.0</ns3:text>
            </ns3:version>
          </ns3:properties>
          <ns3:components>
            <ns3:vfreebusy>
              <ns3:properties>
                <ns3:attendee>
                  <ns3:parameters>
                    <ns3:partstat>
                      <ns3:text>NEEDS-ACTION</ns3:text>
                    </ns3:partstat>
                  </ns3:parameters>
                  <ns3:cal-address>mailto:douglm@mysite.edu</ns3:cal-address>
                </ns3:attendee>
                <ns3:created>
                  <ns3:utc-date-time>2011-06-30T15:45:56Z</ns3:utc-date-time>
                </ns3:created>
                <ns3:dtend>
                  <ns3:date-time>2011-04-30T00:00:00Z</ns3:date-time>
                </ns3:dtend>
                <ns3:dtstamp>
                  <ns3:utc-date-time>2011-06-30T15:45:56Z</ns3:utc-date-time>
                </ns3:dtstamp>
                <ns3:dtstart>
                  <ns3:date-time>2011-04-01T00:00:00Z</ns3:date-time>
                </ns3:dtstart>
                <ns3:freebusy>
                  <ns3:parameters>
                    <ns3:fbtype>
                      <ns3:text>BUSY</ns3:text>
                    </ns3:fbtype>
                  </ns3:parameters>
                  <ns3:period>
                    <ns3:start>2011-04-06T15:00:00Z</ns3:start>
                    <ns3:end>2011-04-06T16:00:00Z</ns3:end>
                  </ns3:period>
                </ns3:freebusy>
                <ns3:last-modified>
                  <ns3:utc-date-time>2011-06-30T15:45:56Z</ns3:utc-date-time>
                </ns3:last-modified>
                <ns3:organizer>
                  <ns3:parameters/>
                  <ns3:cal-address>mailto:douglm@mysite.edu</ns3:cal-address>
                </ns3:organizer>
                <ns3:uid>
                  <ns3:text>2UTDVPZ9H0EQL9QISI44SP5IFPC4N75</ns3:text>
                </ns3:uid>
              </ns3:properties>
            </ns3:vfreebusy>
          </ns3:components>
        </ns3:vcalendar>
      </ns3:icalendar>
    </ns2:freebusyReportResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

14 Multiple operations

Each of the previously described operations acts upon a single entity or resource only. Frequently we have the need to update an interconnected set of entities so that we maintain the consistency of the structure. This requires an atomic operation which can successfully update all the entities or roll back the operation on failure.

The MultiOpType operation provides such a feature. It is essentially a wrapper around any of the other operations which guarantees the success of the entire set or a roll back. Using the id attribute for requests, each individual response can be located in the result.

The MultiOpType request takes the following elements

Field	Type	#	?	Description
operations	Sequence of BaseOperationType	1	Y	Contains one or more operations

Table 48: MultiOpType elements

The response type is also simple containing a single element containing all the responses.

Field	Type	#	?	Description
responses	Sequence of BaseResponseType	1	Y	Contains zero or more responses

Table 49: MultiOpResponseType elements

# Conformance

The last numbered section in the specification must be the Conformance section. Conformance Statements/Clauses go here.

Appendix A. Acknowledgments

The following individuals have participated in the creation of this specification and are gratefully acknowledged

Participants:

- Cyrus Daboo, Apple

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Appendix B. Non-Normative Text

Appendix C. Revision History

Revision	Date	Editor	Changes
06	January 3 2012	M. Douglass	Remove all references to XRD. Define CalWS properties in their place.
05	December 15 2011	M. Douglass	Change example from CalDAV to CalWS
04	November 11 2011	M. Douglass	Updated calendar query to use xcal types instead of names. Assumes a later version of the xcalendar schema to make this possible Change references to "etoken" to "changeToken" Update the error codes with descriptions and a type per error. Added some new errors.
03	September 7 2011	M. Douglass	Add test attribute to calendar query elements.
02		M. Douglass	Added href to fetch response. Change propstat to be extension of BaseResponseType
01	July 15 2011	M. Douglass	Added etoken to ensure consistent updates. Added a multi op which allows the atomic processing of multiple operations in one request Added an id attribute to requests and responses.
Initial	Mar 15 2011	M. Douglass	Initial publication - a first pass at a rewrite from CalWS-REST