iCalendar in XML Format (xCal-Basic)
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Abstract

The mailing list for discussion of this memo is "xCal@INET-Consulting.com" and signup page at "http://INET-Consulting.com/mailman/listinfo/xcal. This is a rerelease of an expired draft with updates and a much more simplified approach. This approach uses an exact 1 to 1 mapping between iCalendar and xml objects.

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

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1. Introduction

xCal is a representation of iCalendar objects in XML. xCal is not an alternative or next generation of iCalendar. This memo defines how to use XML to represent iCalendar objects in XML. These XML objects can be embedded into other XML documents using the XML syntax here. xCal does represent iCalendar components, properties, and parameters as defined in iCalendar. As iCalendar evolves the one to one mapping of iCalendar objects into xCal will continue to work as this memo describes the mapping of iCalendar objects. Within this memo the term "xCa" will mean the XML namespace usage as described in this memo.

This format was selected to ease its translation back to the iCalendar format using an XSLT transform. (See project iCalendar on SourceForge.com - [http://sourceforge.net/projects/icalendar/](http://sourceforge.net/projects/icalendar/) )

NOTE: That [iCAL] is the definitive reference for the definition of iCalendar semantics. This memo only provides an alternative, XML representation for the standard syntax defined in [iCAL]. This memo does not introduce any semantics not already defined by [iCAL].
2. Using XML For Representing iCalendar

In iCalendar names can be in upper case, lower case, or mixed case. In xCal the predefined iCaledars names will be represented in lower case only as XML element and attribute names are case sensitive. Values to properties and parameters that are user specified may be in upper, lower, or mixed case.

All iCalendar component names will be represented in xCal as XML element names in lower case. The "BEGIN:" iCalendar component are represen in xCal as the component name it self in lower case. (BEGIN:VEVENT becomes <vevent>).

All iCalendar property names will be represented in xCal as XML element names in lower case.

All iCalendar parameter names will be represented in xCal as XML attribute names in lower case.

All iCalendar property and parameter values will be represented in xCal unchanged.

BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//hacksw/handcal//NONSGML v1.0//EN
BEGIN:VEVENT
DTSTART:19970714T170000Z
DTEND:19970715T035959Z
SUMMARY;LANGUAGE="en_US":Bastille Day Party
END:VEVENT
END:VCALENDAR

Is represented in xCal as:

```xml
<?xml version="1.0" TODO_NAMESPACE="foo"?>
<iCalendar xmlns:xCal="urn:ietf:params:xml:ns:xcal">
    <vcalendar>
        <version>2.0</version>
        <prodid>-//hacksw/handcal//NONSGML v1.0//EN</prodid>
        <vevent>
            <dtstart>19970714T170000Z</dtstart>
            <dtend>19970715T035959Z</dtend>
            <summary xml:lang="en_US">Bastille Day Party</summary>
        </vevent>
    </vcalendar>
</iCalendar>
```

2.1 XML Dependencies

This memo specifies the XML representation for the standard iCalendar format defined by [ICAL]. There are no XML dependencies other than the [XML] and the [XMLNS] recommendations.

2.2 Working With Standard and XML iCalendar Representations

This memo defines an alternative, XML representation for the standard iCalendar format defined in [ICAL]. This alternative representation provides the same semantics as that defined in the standard format. It is the goal of this memo to allow all [ICAL] extensions and modifications to be translated into and from this XML format.

2.2.1 Conversion

The standard format can be converted to and from this XML format without loss of any calendaring information. When the XML representation was defined, every attempt was made to use existing component, property and parameter naming conventions. This greatly facilitates transformations between the two representations.
2.2.2 Mixed Use of Both Representations

As previously indicated, conversion between the standard and XML representations of iCalendar is a straightforward process. In addition, mixed use of both representations is also possible using MIME objects.

With the use of the MIME multipart content-types, compound MIME entities containing a mix of the standard and XML representations can be specified. This capability is useful in applications where both representations might be encountered. In addition, this capability demonstrates the isomeric nature of the two representations. XML applications conforming to this specification MUST be able to properly parse and process a MIME multipart entity containing the MIME type associated with this iCalendar XML document type.

Internet applications conforming to this memo MUST only send the iCalendar XML document in a "multipart/alternative" MIME entity that also contains an equivalent iCalendar object in the standard format defined by [iCAL]. This restriction will guarantee that the iCalendar object can also be processed by Internet applications that only support the standard iCalendar representation.

2.3 Including Multiple iCalendar Objects

The iCalendar format has the capability for including multiple,
2.4 Mapping Property Parameters to XML

The property parameters defined in the standard iCalendar format are represented in the XML representation as an attribute on element types. The following table specifies some of the attribute name corresponding to each property parameter. This is true for all iCalendar object parameters defined in any iCalendar specification. The property and parameter names will be all lower case. Here are some iCalendar parameter names and how they are mapped to their lower case xCal names.

NOTE: that the iCalendar "language" parameter is converted to the "xml:lang" attribute as an exception to the one to one mapping.

<table>
<thead>
<tr>
<th>Property Parameter Name</th>
<th>Attribute Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALTREP</td>
<td>altrep</td>
</tr>
<tr>
<td>CN</td>
<td>cn</td>
</tr>
<tr>
<td>CUTYPE</td>
<td>cutype</td>
</tr>
<tr>
<td>DELEGATED-FROM</td>
<td>delegated-from</td>
</tr>
</tbody>
</table>
2.5 Mapping VCALENDAR object Properties to XML

Calendar properties defined in the standard iCalendar format provide information about an iCalendar object, as a whole. The calendar properties are represented in the XML representation as element types as shown in lower case. Here is a list of some iCalendar properties and them mapped to xCal lower case names:

<table>
<thead>
<tr>
<th>Calendar</th>
<th>Tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Name</td>
<td>Name</td>
</tr>
<tr>
<td>ACTION</td>
<td>action</td>
</tr>
<tr>
<td>ATTACH</td>
<td>attach</td>
</tr>
<tr>
<td>ATTENDEE</td>
<td>attendee</td>
</tr>
<tr>
<td>CALSCALE</td>
<td>calscale</td>
</tr>
<tr>
<td>CATEGORIES</td>
<td>categories</td>
</tr>
<tr>
<td>CLASS</td>
<td>class</td>
</tr>
<tr>
<td>COMMENT</td>
<td>comment</td>
</tr>
<tr>
<td>COMPLETED</td>
<td>completed</td>
</tr>
</tbody>
</table>

---

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The semantics for these are as specified for the corresponding calendar property in [iCAL].

2.6 Mapping All Components to XML

All components in xCal are mapped to their component name without the
BEGIN tag. This example show how many component names are mapped to xCal lower case names:

<table>
<thead>
<tr>
<th>Component</th>
<th>Element</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEVENT</td>
<td>vevent</td>
<td>&lt;vevent&gt; ... &lt;/vevent&gt;</td>
</tr>
<tr>
<td>VTODO</td>
<td>vtodo</td>
<td>&lt;vtodo&gt; ... &lt;/vtodo&gt;</td>
</tr>
<tr>
<td>VJOURNAL</td>
<td>vjournal</td>
<td>&lt;vjournal&gt; ... &lt;/vjournal&gt;</td>
</tr>
<tr>
<td>VTIMEZONE</td>
<td>vtimezone</td>
<td>&lt;vtimezone&gt; ... &lt;/vtimezone&gt;</td>
</tr>
<tr>
<td>STANDARD</td>
<td>standard</td>
<td>&lt;standard&gt; ... &lt;/standard&gt;</td>
</tr>
<tr>
<td>DAYLIGHT</td>
<td>daylight</td>
<td>&lt;daylight&gt; ... &lt;/daylight&gt;</td>
</tr>
<tr>
<td>X-...</td>
<td>x-...</td>
<td>&lt;x-...&gt; ... &lt;/x-...&gt;</td>
</tr>
</tbody>
</table>

2.7 Mapping All Values to XML

The [iCAL] specification specifies that the equivalent component properties to the "comment", "description", "location", "summary" and "contact" element types can contain formatted content, such as is specified by multiple lines of text. In such cases, the formatted text should be specified using standard XML escaping.

Values MUST NOT be mapped to lower case. iCalendar property values and iCalendar parameter values are used without lower case conversion.

Values that have characters forbidden by XML MUST be encoded using standard XML escaping mechanisms.

Values that containe XML tags like in this example:

```
DESCRIPTION:How to map xml DESCRIPTION into
an XML <description> element.
```

Would be encoded using standard XML encoding as shown here:

```
<description>How to map xml DESCRIPTION into
an XML &lt;description&gt; element.&lt;/description&gt;
```
2.8 Emailing the iCalendar XML Representation

It is expected that iCalendar XML documents will need to be sent over SMTP/MIME email. The "text/xml" and "application/xml" content-types have been registered for XML documents. However, use of these content-type definitions present some problems for XML applications such as calendaring and scheduling.

The "text/xml" and "application/xml" content-type definitions do not provide for any header field parameters to identify the type of XML document contained in the MIME entity. This means that a recipient mail user agent must (MUA) open up each "text/xml" or "application/xml" content in order to determine what object handler is needed to process the information. To a MUA, all XML documents look like just plain "text/xml" or "application/xml" content.

Additionally, it is accepted practice for a MUA to provide iconic feedback to the user for individual content-types that are supported by the MUA. For example, not only would feedback be provided for a calendaring and scheduling content. Some further unique identification would also be provided for each different scheduling message; such as a meeting invitation, response to an invitation, reschedule notice, cancellation notice, etc. In such cases, acceptable performance by the MUA is dependent on the existence of header field information, such as it provided in the definition of the "text/calendar" content-type by [iCAL].

Internet application conforming to this memo MUST identify iCalendar XML documents with the experimental content-type "application/calendar+xml".

    content-type:application/calendar+xml

The content-type can also include the "optinfo" parameter to specify any other optional iCalendar information. The semantics of these content-type parameters is as defined in [iCAL].

Internet applications conforming to this memo MUST only send the iCalendar XML document in a "multipart/alternative" MIME entity that
also contains an equivalent iCalendar object in the standard format defined by [iCAL]. This restrict will guarantee that the iCalendar object can also be processed by internet applications that only support the standard iCalendar format.

An XML application supporting the iCalendar XML document type MUST be able to receive and properly process the "application/calendar+xml" document contained within a "multipart" message content-type.

2.9 iCalendar XML Representation and File Systems

The iCalendar XML documents will be stored in file systems. The accepted practice for file extensions for XML documents is the text "XML". However, in order to uniquely identify iCalendar XML documents for file association with applications that can directly process this document type, it is RECOMMENDED that the file extension be the text "XCS".
3. Example Usage

The following sections provide various examples of iCalendar XML documents.

3.1 A well-formed and valid iCalendar XML document

The following is a simple example of a iCalendar XML document. This document is both a well-formed and valid XML document. The iCalendar object specifies an appointment.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<iCalendar xmlns:xCal="urn:ietf:params:xml:ns:xcal">
  <method>PUBLISH</method>
  <version>2.0</version>
  <prodid>-//HandGen//NONSGML vGen v1.0//EN</prodid>
  <vevent>
    <uid>19981116T150000@cal10.host.com</uid>
    <dtstamp>19981116T145958Z</dtstamp>
    <summary>Project XYZ Review</summary>
    <location>Conference Room 23A</location>
    <dtstart>19981116T163000Z</dtstart>
    <dtend>19981116T190000Z</dtend>
    <x-foo-cust-code>1998-ABC Corp-1234</x-foo-cust-code>
</vevent>
</iCalendar>
```
3.2 Including binary content in attachments

The following is an example of a valid iCalendar XML document that also includes an external reference to an attachment. The iCalendar object specifies a meeting invitation with an attachment.
The following is an example of a well-formed and valid iCalendar XML document that includes an attachment as inline binary content. The iCalendar object specifies a meeting invitation with an attachment.
<dtstamp>19981211T132928Z</dtstamp>
<organizer>MAILTO:jim@host.com</organizer>
<dtstart>19981212T150000Z</dtstart>
<dtend>19981212T160000Z</dtend>
<summary>Department Meeting</summary>
<location>Conference Room 23A</location>
<attendee role="CHAIR">MAILTO:jim@host.com</attendee>
<attendee role="REQ-PART" rsvp="TRUE">MAILTO:joe@host.com</attendee>
<attendee role="REQ-PART" rsvp="TRUE">MAILTO:steve@host.com</attendee>
<attach fmttype="IMAGE/JPEG">MIICajCCAdOgAwIBAgI
CBEUwDQEBQAwzELMAkGA1UEBhMCVVMxLDAqBgNVBAoTI05ldHNjYXB</attach>

3.3 iCalendar XML document with multiple iCalendar objects

The following is an example of a well-formed and valid iCalendar XML document that includes more than one iCalendar object.
3.4 Using the iCalendar namespace

The following is an example of a snippet of a XML document that includes elements from the iCalendar name-space.

```xml
<x xmlns:xCal="urn:ietf:params:xml:ns:xcal">
  <xmlns:pdi="http://pdi.org/schema">
    <xCal:dtstart>19981123T133000Z</xCal:dtstart>
    <xCal:dtend>19981123T203000Z</xCal:dtend>
    <pdi:idnum>1234567</pdi:idnum>
    <pdi:usage>999.99</pdi:usage>
  </x>
</x>
```

3.5 Publish meeting information

The following is a snippet of an iCalendar XML document that publishes information about a meeting.
3.6 Publish transparent annual event

The following is a snippet of an iCalendar XML document that publishes information about an annually repeating event that is transparent to busy time searches.

```
<iCalendar xmlns:xCal="urn:ietf:params:xml:ns:xcal">
  <vcalendar>
    <version>2.0</version>
    <prodid>-//hacksw/handcal//NONSGML 1.0//EN</prodid>
    <method>PUBLISH</method>
    <vevent>
      <uid>19970901T130000Z-123401@host.com</uid>
      <dtstamp>19970901T130000Z</dtstamp>
      <dtstart>19970903T163000Z</dtstart>
      <dtend>19970903T190000Z</dtend>
      <summary>Annual Employee Review</summary>
      <class>PRIVATE</class>
      <categories>Business,Human Resources</categories>
    </vevent>
  </vcalendar>
</iCalendar>
```

3.7 Meeting invitation

The following is a snippet of an iCalendar XML document that specifies an invitation for a meeting. The meeting occurs on the
first Monday of each year for five years.

3.8 Publish busy time

The following is an iCalendar XML document that publishes busy time information. The default value for the "method" attribute is "PUBLISH" and does not need to be specified in this example.
3.9 Request busy time

The following is a snippet of an iCalendar XML document that requests a calendar user's busy time information.

```xml
<iCalendar xmlns:xCal="urn:ietf:params:xml:ns:xcal">
  <vcalendar>
    <method>REQUEST</method>
    <version>2.0</version>
    <prodid>-//hacksw/handcal//NONSGML 1.0//EN</prodid>
    <vfreebusy>
      <uid>19970901T083000@ical1.host.com</uid>
      <dtstamp>19970901T083000Z</dtstamp>
      <organizer>MAILTO:jane_doe@host1.com</organizer>
      <dtstart>19971015T050000Z</dtstart>
      <dtend>19971015T050000Z</dtend>
      <attendee>MAILTO:john_public@host2.com</attendee>
    </vfreebusy>
  </vcalendar>
</iCalendar>
```

3.10 Issue a CAP command

The following is a snippet of an iCalendar XML document that issues a CAP command to delete a UID.

```xml
<iCalendar xmlns:xCal="urn:ietf:params:xml:ns:xcal">
  <vcalendar>
    <version>2.0</version>
    <prodid>-//hacksw/handcal//NONSGML 1.0//EN</prodid>
    <target>relcalid-22</target>
    <cmd id="random but unique per CUA">DELETE</cmd>
  </vcalendar>
</iCalendar>
```
4. Acknowledgments

The following have participated in the drafting and discussion of this memo:

Greg FitzPatrick, Charles Goldfarb, Paul Hoffman, Lisa Lippert, Thomas Rowe.
5. IANA Considerations

TODO - registration if application/calendar+xml
6. Security Considerations

CDATA Sections -- A XML iCalendar document may contain CDATA sections to represent content for specific element types. The CDATA section specifies arbitrary character data that is not meant to be interpreted. It is not scanned by the XML parser for markup. While this memo restricts that any CDATA section MUST NOT contain markup or other such alternate representation for the property value, in general, CDATA section from a non-conformant implementation can contain content such as HTML markup. HTML text can be used to invoke programs. Implementors should be aware that this may leave an implementation open to malicious attack that might occur as a result
of executing the markup in the CDATA section.

PROCEDURAL ALARMS -- A XML iCalendar document can be created that contains a "VEVENT" calendar component with "VALARM" calendar components. The "VALARM" calendar component can be of type PROCEDURE and can have an attachment containing some sort of executable program. Implementations that incorporate these types of alarms are subject to any virus or malicious attack that might occur as a result of executing the attachment.

ATTACHMENTS -- A XML iCalendar document can include references to Uniform Resource Locators that can be programmed resources. Implementers and users of this memo should be aware of the network security implications of accepting and parsing such information.

In addition, the security considerations observed by implementations of electronic mail systems should be followed for this memo.


[iCAL] F. Dawson and D. Stenerson, "Internet Calendaring and Scheduling Core Object Specification (iCalendar)", RFC 2445, http://www.ietf.org/rfc/rfc2445.txt, November 1998. This is the current version of iCalednar used in examples in this memo.


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