

Internet Engineering Task Force (IETF)
Request for Comments: 6502
Category: Standards Track
ISSN: 2070-1721

G. Camarillo
Ericsson
S. Srinivasan

R. Even
Gesher Erovo Ltd
J. Urpalainen
Nokia
March 2012

Conference Event Package Data Format Extension for Centralized Conferencing (XCON)

Abstract

This document specifies the notification mechanism for XCON (centralized conferencing). This mechanism reuses the SIP (Session Initiation Protocol) event package for conference state. Additionally, the notification mechanism includes support for the XCON data model and for partial notifications.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at <http://www.rfc-editor.org/info/rfc6502>.

Copyright Notice

Copyright (c) 2012 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

This document may contain material from IETF Documents or IETF Contributions published or made publicly available before November 10, 2008. The person(s) controlling the copyright in some of this material may not have granted the IETF Trust the right to allow modifications of such material outside the IETF Standards Process. Without obtaining an adequate license from the person(s) controlling the copyright in such materials, this document may not be modified outside the IETF Standards Process, and derivative works of it may not be created outside the IETF Standards Process, except to format it for publication as an RFC or to translate it into languages other than English.

Table of Contents

1. Introduction	3
2. Terminology	4
3. Notification Formats	5
4. Full Notifications	5
4.1. Backwards Compatibility	5
5. Partial Notifications	6
5.1. Generation of Partial Notifications	6
5.2. Processing of Partial Notifications	7
5.3. Partial Notification Format	8
5.4. XML Schema for Partial Notifications	8
5.5. Examples	9
6. IANA Considerations	10
6.1. MIME type Registration: application/xcon-conference-info+xml	10
6.2. MIME type Registration: application/xcon-conference-info-diff+xml	11
6.3. URN Sub-Namespace Registration: xcon-conference-info-diff	12
6.4. XML Schema Registration	12
7. Security Considerations	12
8. References	13
8.1. Normative References	13
8.2. Informative References	13

1. Introduction

The XCON (Centralized Conferencing) framework [RFC5239] defines a notification service that provides updates about a conference instance's state to authorized parties using a notification protocol, as shown in Figure 1. This document specifies how to use the SIP (Session Initiation Protocol [RFC3261]) event package for conference state defined in [RFC4575] as a notification protocol between a client and a conference's notification server.

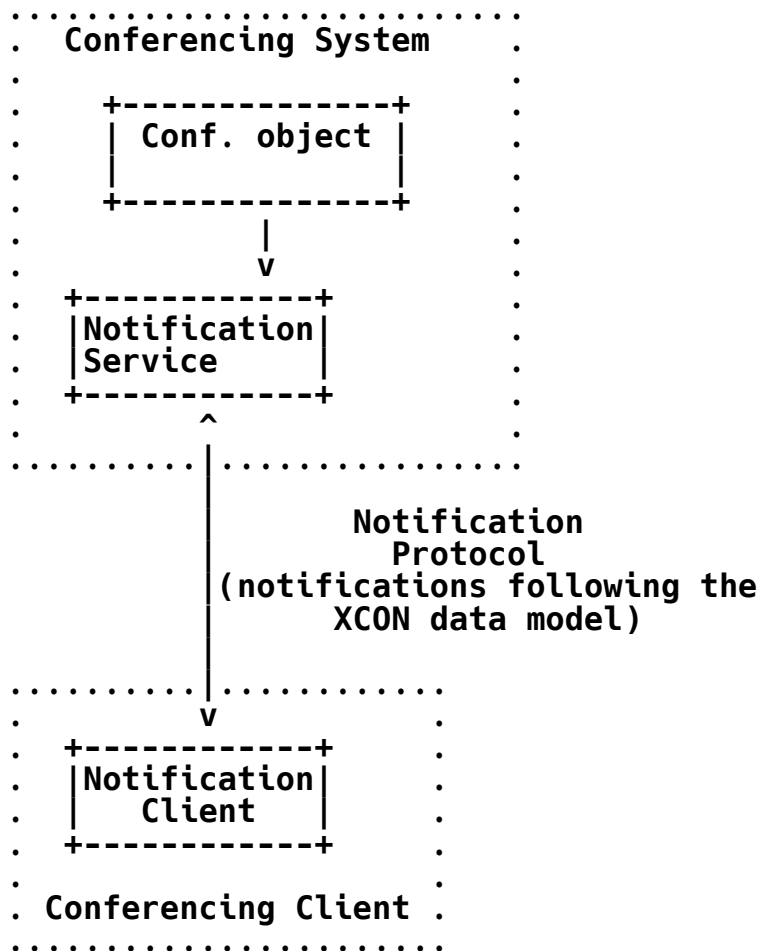


Figure 1: Notification service and protocol in the XCON architecture

In addition to specifying the SIP event package for conference state, [RFC4575] specifies a data format to be used with the event package. The XCON data model [RFC6501] extends that format with new elements and attributes so that the extended format supports more functionality (e.g., floor control). The notification protocol specified in this document supports all the data defined in the XCON data model (i.e., the data originally defined in [RFC4575] plus all the extensions defined in [RFC6501]) plus a partial notification mechanism based on XML patch operations [RFC5261].

2. Terminology

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 [RFC2119].

3. Notification Formats

In order to obtain notifications from a conference server's notification service, a client subscribes to the 'conference' event package at the server as specified in [RFC4575]. Per [RFC4575], NOTIFY requests within this event package can carry an XML document in the "application/conference-info+xml" format. Additionally, per this specification, NOTIFY requests can also carry XML documents in the "application/xcon-conference-info+xml" and the "application/xcon-conference-info-diff+xml" formats.

A document in the "application/xcon-conference-info+xml" format provides the user agent with the whole state of a conference instance. A document in the "application/xcon-conference-info-diff+xml" format provides the user agent with the changes the state of the conference instance has experienced since the last notification sent to the user agent.

4. Full Notifications

Subscribers signal support for full notifications by including the "application/xcon-conference-info+xml" format in the Accept header field of the SUBSCRIBE requests they generate. If a client subscribing to the 'conference' event package generates an Accept header field that includes the MIME type "application/xcon-conference-info+xml", the server has the option of returning documents that follow the XML format specified in [RFC6501] and are carried in "application/xcon-conference-info+xml" message bodies.

4.1. Backwards Compatibility

Conference servers that implement the SIP event package for conference state and support the "application/xcon-conference-info+xml" MIME type MUST also support the "application/conference-info+xml" MIME type. This way, legacy clients, which only support "application/conference-info+xml", are able to receive notifications in a format they understand.

Clients that implement the SIP event package for conference state and support the "application/xcon-conference-info+xml" MIME type SHOULD also support the "application/conference-info+xml" MIME type. This way, these clients are able to receive notifications from legacy servers, which only support "application/conference-info+xml", in a format they understand.

5. Partial Notifications

The conference state reported by this event package may contain many elements. When the "xcon-conference-info+xml" format is used and there is a change in the state of an element, the server generates a notification with the whole conference state. Generating large notifications to report small changes does not meet the efficiency requirements of some bandwidth-constrained environments. The partial notifications mechanism specified in this section is a more efficient way to report changes in the conference state.

The SIP event package for conference state defined a partial notification mechanism based on <state> elements. Servers compliant with this specification **MUST NOT** use that partial notification mechanism. Instead, they **MUST** use the mechanism specified in this section.

Subscribers signal support for partial notifications by including the "application/xcon-conference-info-diff+xml" format in the Accept header field of the SUBSCRIBE requests they generate. If a client subscribing to the 'conference' event package generates an Accept header field that includes the MIME type "application/xcon-conference-info-diff+xml", the server has the option of returning documents that follow the XML format specified in Section 5.4 and are carried in "application/xcon-conference-diff-info+xml" message bodies.

5.1. Generation of Partial Notifications

Once a subscription is accepted and installed, the server **MUST** deliver full state in its first notification. To report full state, the server **MUST** set the Content-Type header field to the value "application/xcon-conference-info+xml".

In order to deliver a partial notification, the server **MUST** set the Content-Type header field to the value "application/xcon-conference-info-diff+xml". When the server generates a partial notification, the server **SHOULD** only include the information that has changed compared to the previous notification. It is up to the server's local policy to determine what is considered as a change to the previous state.

The server **MUST** construct partial notifications according to the following logic: all the information that has been added to the document is listed inside <add> elements. All information that has been removed from the document is listed inside <remove> elements, and all information that has been changed is listed under <replace> elements.

The server **MUST NOT** send a new NOTIFY request with a partial notification until it has received a final response from the subscriber for the previous one or the previous NOTIFY request has timed out.

When the server receives a SUBSCRIBE request (refresh or termination) within the associated subscription, it **SHOULD** send a NOTIFY request containing the full document using the 'application/xcon-conference-info+xml' content type.

If the server has used a content type other than 'application/xcon-conference-info+xml' in notifications within the existing subscription and changes to deliver partial notifications, the server **MUST** deliver full state using the 'application/xcon-conference-info+xml' content type before generating its first partial notification.

5.2. Processing of Partial Notifications

When a subscriber receives the first notification containing full state in a 'application/xcon-conference-info+xml' MIME body, the subscriber **MUST** store the received full document as its local copy.

When the subscriber receives a subsequent notification, the subscriber **MUST** modify its locally stored information according to the following logic:

- o If the notification carries an 'application/xcon-conference-info+xml' document, the subscriber **MUST** replace its local copy of the document with the document received in the notification.
- o If the notification carries an 'application/xcon-conference-info-diff+xml' document, the subscriber **MUST** apply the changes indicated in the received 'application/xcon-conference-info-diff+xml' document to its local copy of the full document.

If the subscriber encounters a processing error while processing an 'application/xcon-conference-info-diff+xml' encoded document, the subscriber **SHOULD** renew its subscription. A subscriber can fall back to normal operations by not including the "application/xcon-conference-info-diff+xml" format in a new SUBSCRIBE request.

If the server changes the content type used in notifications within the existing subscription, the subscriber **MUST** discard all the previously received information and process the new content as specified for that content type.

5.3. Partial Notification Format

An xcon-conference-info-diff document is an XML [W3C.REC-xml-20081126] document that MUST be well-formed and SHOULD be valid. The namespace URI for the <conference-info-diff> root document element is defined in [RFC6501]:

urn:ietf:params:xml:ns:xcon-conference-info

The root document element <conference-info-diff> has a single mandatory attribute, "entity". The value of this attribute is the conference object identifier (XCON-URI) that identifies the conference being described in the document.

The content of the <conference-info-diff> element is an unordered sequence of <add>, <replace>, and <remove> elements followed by elements from other namespaces for the purposes of extensibility. Any such unknown elements MUST be ignored by the client. The <add>, <replace>, and <remove> elements can contain other extension attributes than what are defined in the corresponding base types of [RFC5261].

5.4. XML Schema for Partial Notifications

This is the XML schema for the "application/xcon-conference-info-diff+xml" data format. The "urn:ietf:params:xml:schema:xml-patch-ops" schema is defined in [RFC5261].

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  targetNamespace="urn:ietf:params:xml:ns:xcon-conference-info"
  xmlns="urn:ietf:params:xml:ns:xcon-conference-info"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <!-- include patch-ops type definitions -->
  <xs:include
    schemaLocation="urn:ietf:params:xml:schema:patch-ops"/>
  <!-- partial updates -->
  <xs:element name="conference-info-diff">
    <xs:complexType>
      <xs:sequence minOccurs="0" maxOccurs="unbounded">
        <xs:choice>
          <!-- add some content -->
          <xs:element name="add">
            <xs:complexType mixed="true">
              <xs:complexContent>
```



```

    <xs:extension base="add">
      <xs:anyAttribute processContents="lax"/>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
</xs:element>
<!-- remove some content -->
<xs:element name="remove">
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="remove">
        <xs:anyAttribute processContents="lax"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
<!-- replace some content -->
<xs:element name="replace">
  <xs:complexType mixed="true">
    <xs:complexContent>
      <xs:extension base="replace">
        <xs:anyAttribute processContents="lax"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
<!-- allow extension elements from other namespaces -->
<xs:any namespace="##other" processContents="lax"/>
</xs:choice>
</xs:sequence>
<xs:attribute name="entity" type="xs:anyURI" use="required"/>
<xs:anyAttribute processContents="lax"/>
</xs:complexType>
</xs:element>
</xs:schema>

```

5.5. Examples

The following is an 'application/xcon-conference-info-diff+xml' partial update document:

```

<?xml version="1.0" encoding="UTF-8"?>
<conference-info-diff
  xmlns="urn:ietf:params:xml:ns:xcon-conference-info"
  entity="conference123@example.com">

```

```
<add
  sel="*/users/allowed-users-list"> <target
    uri="sip:john@example.com" method="refer"/>
  </add>

  <replace sel="*/conference-state/user-count/text()">5</replace>
</conference-info-diff>
```

6. IANA Considerations

There are four IANA considerations associated with this specification.

6.1. MIME type Registration: application/xcon-conference-info+xml

This section registers the 'application/xcon-conference-info+xml' MIME type.

MIME media type name: application

MIME subtype name: xcon-conference-info+xml

Mandatory parameters: none

Optional Parameters: Same as charset parameter application/xml as specified in [RFC3023].

Encoding considerations: Same as encoding considerations of application/xml as specified in [RFC3023].

Security considerations: Security considerations: See Section 10 of [RFC3023].

Interoperability considerations: none

Published specification: RFC 6502

Applications that use this media type: This document type has been defined to support centralized conferencing applications.

Additional Information:

Magic Number: none

File extension: .xml

Macintosh file type code: "TEXT"

Personal and email address for further information: IETF XCON Working Group <xcon@ietf.org>

Intended usage: COMMON

Author/Change controller: The IETF.

6.2. MIME type Registration: application/xcon-conference-info-diff+xml

This section registers the 'application/xcon-conference-info-diff+xml' MIME type.

MIME media type name: application

MIME subtype name: xcon-conference-info-diff+xml

Mandatory parameters: none

Optional Parameters: Same as charset parameter application/xml as specified in [RFC3023].

Encoding considerations: Same as encoding considerations of application/xml as specified in [RFC3023].

Security considerations: Security considerations: See Section 10 of [RFC3023].

Interoperability considerations: none

Published specification: RFC 6502

Applications that use this media type: This document type has been defined to support partial notifications in centralized conferencing applications.

Additional Information:

Magic Number: none

File extension: .xml

Macintosh file type code: "TEXT"

Personal and email address for further information: IETF XCON Working Group <xcon@ietf.org>

Intended usage: COMMON

Author/Change controller: The IETF.

6.3. URN Sub-Namespace Registration: xcon-conference-info-diff

This section registers a new XML namespace per the procedures in [RFC3688].

URI: urn:ietf:params:xml:ns:xcon-conference-info-diff

Registrant Contact: IETF SIPPING working group <sipping@ietf.org>, Gonzalo Camarillo <Gonzalo.Camarillo@ericsson.com>

XML:

```
<?xml version="1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML Basic 1.0//EN"
    "http://www.w3.org/TR/xhtml-basic/xhtml-basic10.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <meta http-equiv="content-type"
    content="text/html; charset=iso-8859-1"/>
  <title>Partial Notifications in Centralized Conferencing</title>
</head>
<body>
  <h1>Namespace for Partial Notifications in</h1>
  <h1>Centralized Conferencing</h1>
  <h2>urn:ietf:params:xml:ns:xcon-conference-info-diff</h2>
  <p>See <a href="http://www.rfc-editor.org/rfc/rfc6502.txt">
    RFC 6502</a>.</p>
</body>
</html>
```

6.4. XML Schema Registration

This section registers an XML schema per the procedures in [RFC3688].

URI: urn:ietf:params:xml:ns:xcon-conference-info-diff

Registrant Contact: IETF XCON working group, <xcon@ietf.org>, Gonzalo Camarillo <Gonzalo.Camarillo@ericsson.com>

The XML for this schema can be found in Section 5.4.

7. Security Considerations

This document specifies how to deliver notifications using the SIP event package for conference state in two new formats. The fact that notifications are encoded in a different format does not have

security implications. Section 8 of [RFC4575] contains security considerations related to the use of the event package. Implementers of the event package need to follow those considerations regardless of the format used to encode their notifications.

8. References

8.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [RFC3023] Murata, M., St. Laurent, S., and D. Kohn, "XML Media Types", RFC 3023, January 2001.
- [RFC3261] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M., and E. Schooler, "SIP: Session Initiation Protocol", RFC 3261, June 2002.
- [RFC4575] Rosenberg, J., Schulzrinne, H., and O. Levin, "A Session Initiation Protocol (SIP) Event Package for Conference State", RFC 4575, August 2006.
- [RFC5261] Urpalainen, J., "An Extensible Markup Language (XML) Patch Operations Framework Utilizing XML Path Language (XPath) Selectors", RFC 5261, September 2008.
- [RFC6501] Novo, O., Camarillo, G., Morgan, D., and J. Urpalainen, "Conference Information Data Model for Centralized Conferencing (XCON)", RFC 6501, March 2012.
- [W3C.REC-xml-20081126]
Bray, T., Paoli, J., Sperberg-McQueen, C., Maler, E., and F. Yergeau, "Extensible Markup Language (XML) 1.0 (Fifth Edition)", World Wide Web Consortium Recommendation REC-xml-20081126, November 2008,
<<http://www.w3.org/TR/2008/REC-xml-20081126>>.

8.2. Informative References

- [RFC3688] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688, January 2004.
- [RFC5239] Barnes, M., Boulton, C., and O. Levin, "A Framework for Centralized Conferencing", RFC 5239, June 2008.

Authors' Addresses

Gonzalo Camarillo
Ericsson
Hirsalantie 11
Jorvas 02420
Finland

E-Mail: Gonzalo.Camarillo@ericsson.com

Srivatsa Srinivasan

E-Mail: srivatsa.srinivasan@gmail.com

Roni Even
Gesher Erovo Ltd
14 David Hamelech
Tel Aviv 64953
Israel

E-Mail: ron.even.tlv@gmail.com

Jari Urpalainen
Nokia
Itamerenkatu 11-13
Helsinki 00180
Finland

E-Mail: jari.urpalainen@nokia.com