Guidelines for Implementing the Dialog Event Package in User Agents
draft-worley-sip-dialog-03

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Abstract

   This document sets out guidelines for how Session Initiation Protocol
   (SIP) user agents (UAs) should implement the dialog event package in
   order to be usable in systems that implement end-point controlled
   call-control (EPCC) features. The guidelines are in addition to the
   basic requirements for dialog event package implementation in RFC
   3265 and RFC 4235.

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1. Background

The Session Initiation Protocol (SIP) [1] implements telephony and
similar applications over the Internet. SIP largely conforms to the
"end-to-end principle"[4], putting the major responsibility for
"call-control features" on the user agents (telephones) themselves,
in contrast to traditional telephony, where the intelligence is
concentrated in a small number of centralized switches. This scheme
for implementing call-control features is called EPCC, end-point
controlled call control. In order for a user agent to interact with
dialogs (calls) that are present on other user agents, those user
agents must publish the state of the dialogs in which they are
participating in a dialog event package[2][3]. A user agent can
retrieve a second user agent's dialog event package to obtain the
identifiers of the second user agent's dialogs, and using those
identifiers, the first user agent can manipulate those dialogs.

Unfortunately, the dialog event package was specified before the
breadth of its importance was fully understood, so its specification
is relatively loose -- loose enough that many implementations
conforming to the standard are not usable for end-point call control
(EPCC). It is the purpose of this document to provide a
specification of the dialog event package that is tight enough to
ensure that a user agent can fully participate in current and future
EPCC operations.

This document is not intended to advance toward standardization.
However, if it proves valuable to implementors, it may evolve into a
statement of best common practice.

2. Guidelines

   This section contains the guidelines for implementing high-quality
   dialog event packages, and a discussion of the motivation for each
   guideline.

2.1. Addressing

   A potential subscriber to the dialog event package will often know
   only an AOR (address of record) to identify the UA with which it
   desires to communicate, so the subscriber will have to route its
   SUBSCRIBE through a proxy for the AOR. The proxy will route the
   SUBSCRIBE to the registered contact URIs for that AOR.

   Alternatively, a potential subscriber may know of a contact URI that
   the UA has used within a transaction or dialog. Contact URIs may
   route directly to the UA.

   In a third case, a potential subscriber knows of a URI that is a GRUU
   for the UA. GRUUs route through the proxy for a SIP domain (like
   AORs), but always route to only one UA (like contact URIs).

   Guideline 1: A UA should accept SUBSCRIBEs to all URIs that it uses
                 as contacts for AORs, and all URIs that it uses as
                 contacts in transactions or dialogs.

   A single UA may have contacts for multiple AORs, some of which may
   have contacts at other UAs. So dialog events "for an AOR" should
   only contain information about dialogs that were somehow addressed to
   that AOR.

   Guideline 2: A SUBSCRIBE to a URI that the UA uses as a contact for
                 an AOR should obtain dialog events that describe only
                 INVITEs "for the AOR" that corresponds to that URI.

   This guideline implies that a UA should use different contact
   addresses for every AOR for which it registers. Choosing contact
   addresses can be done in many ways. One method is to apply a URI-
   parameter with varying values to a base URI. The URI-parameter
   "x-line-id" is commonly used for this purpose. So the base URI
   <sip:ua1@10.1.1.1> can be used to generate the series of contact
   URIs:

      sip:ua1@10.1.1.1;x-line-id=a123

      sip:ua1@10.1.1.1;x-line-id=a842

        sip:ua1@10.1.1.1;x-line-id=0

   Guideline 3: A SUBSCRIBE to a URI that the UA uses as a contact for
                 a dialog or transaction should obtain dialog events
                 that describe only INVITEs "for the AOR" that
                 corresponds to that URI.

2.2. Status/Presence

   Attendant consoles and other status reporting devices sometimes want
   information about the status of a UA as a whole (and thus implicitly
   its user's status), rather than about all dialogs that were addressed
   to a particular AOR. It would be desirable if there was a way to
   subscribe to events for all dialogs on a UA, but there seems to be no
   way for the UA to disseminate such a URI, and no standardized way to
   construct one. Perhaps a parameter on the request URI, or a
   parameter on the event package name in the Event header, could be
   used to indicate a desire for information for the entire UA.

   The concept of such a subscription raises the question of "What are
   all the URIs for a UA?", since the UA may not be a discrete physical
   object. The concept of to "URIs being lines on the same UA" doesn't
   seem to be intrinsic to SIP. Perhaps the set of contact URIs that
   share a +sip.instance value should be considered to comprise "a UA".

2.3. Dialog Package Data

   RFC 4235 [2] does not define what is to be considered the "resource"
   that is the subject of a dialog event subscription, and thus, what is
   to be the value of the entity attribute of the dialog-info element.
   But the examples in [2] make its intended use clear:

   Guideline 4: The entity attribute of the dialog-info element should
                 contain the AOR corresponding to the contact URI that
                 was the request-URI of the SUBSCRIBE establishing the
                 subscription.

   In order to implement EPCC, the dialog event package needs to contain
   each dialog's identifiers. In addition, in order to be able to
   select the dialog that has been ringing the longest out of a set of
   early dialogs, the dialog event package needs to contain the duration
   element. (The state element is mandatory per [2].)

   Guideline 5: The dialog event package should include the call-id,
                 local-tag, remote-tag, and direction attributes of the
                 dialog element. It should include the duration and
                 state sub-elements of the dialog element.

In order to allow a variety of EPCC functions, the data in the dialog event package needs to comprehensively describe the dialog's endpoints in a standard way. The examples in [2] show the intended usage:

Guideline 6: The dialog event package should use the following
              sources for the following elements:

              A. The local and remote elements are to report the
                  initiator's or recipient's information, as
                  determined by the direction attribute.

              B. initiator's identity: the "From" header of the
                  original INVITE

              C. initiator's target: the "Contact" header of the
                  original INVITE, as updated by any UPDATE or re-
                  INVITE

              D. recipient's identity: the "From" header that would
                  be used when initiating a call from the AOR
                  corresponding to the request-URI as seen by the
                  recipient, or alternatively, the "To" header of the
                  original INVITE

              E. recipient's target: the "Contact" header of the
                  original 2xx response to the INVITE, as updated by
                  any UPDATE or re-INVITE

   Note that both Contact headers can be updated by re-INVITE and UPDATE
   requests during the dialog:

   Guideline 7: The local and remote target elements in the dialog
                 event package should be updated when the contacts of
                 the endpoints change.

3. Security Considerations

   Privacy and security considerations suggest that different components
   of the dialog package should be accessible to different subscribers.
   At a minimum, three levels of access can be distinguished: all dialog
   information, busy/not-busy information, and no information. Further
   work is needed to determine appropriate levels of access and how to
   restrict each level of access to the appropriate subscribers.

3.1. Access to All Information

   Because an agent that knows a dialog's parameters has total control
   over the dialog, dissemination of the parameters should be restricted
   to trusted agents. (E.g., imagine the Jerky Boys subscribing to
   dialog events for your organization's customer service line.)

   Guideline 8: A UA should have a way of restricting dialog
                 information to trusted subscribers. A UA should
                 provide one of the following methods to determine which
                 subscribers are trusted:

                 A. only SUBSCRIBEs coming directly from specified IP
                     address(es) are trusted (which delegates security
                     decisions to the SIP agent(s) at those
                     address(es)), or

                 B. only SUBSCRIBEs authorized by appropriate keys are
                     trusted (which requires a keying infrastructure).

   Guideline 9: If method A is used, an additional mechanism may be
                 needed for the SIP agent(s) which make the security
                 decisions to communicate to the UA the level of
                 disclosure to be made by the subscription.

3.2. Access to Busy/Not-busy Information

   Untrusted SUBSCRIBEs may come from any place on the Internet.
   Because the dialog event package provides presence information even
   if the dialog identifiers are removed, and presence information has
   privacy implications:

   Guideline 10: A UA should provide even edited versions of the dialog
                  event package only to subscribers which pass a
                  security/privacy policy, and not indiscriminately.

4. **Current Implementations**

   Current implementation data has not been analyzed.

5. Revision History

5.1. Changes from draft-worley-sipping-dialog-00 to draft-worley-sip-dialog-00

Changed document name base from "draft-worley-sipping-dialog" to "draft-worley-sip-dialog" since the dialog event package now is an RFC and is now a SIP WG responsibility.

Add a statement regarding the intended future of this draft.

Narrowed the URIs that a UA must accept to contacts that it has registered or used in transactions, since a subscriber cannot reliably guess at any other URI. (Thanks to Michael Procter.)

Added a discussion of the open question of how to subscribe to information about all the dialogs on a single UA. (Thanks to Michael Procter.)

Added guideline on correspondence between the SUBSCRIBE request-URI and the entity attribute.

Renumbered the guidelines.

Removed information on current implementations.

Start correcting reference for "End-to-End Arguments in System Design".

Various edits to improve clarity.

5.2. Changes from draft-worley-sip-dialog-00 to draft-worley-sip-dialog-01

Add requirement for the duration element.

Fix reference for "End-to-End Arguments in System Design". (Thanks to Elwyn Davies.)

5.3. Changes from draft-worley-sip-dialog-01 to draft-worley-sip-dialog-02

Update contact information.

Add reference to RFC 3265.

Use <list style='format Guideline %d:' counter='guidelines'> to number the guidelines automatically.

Revised the Current Implementations section.

5.4. Changes from draft-worley-sip-dialog-02 to
      draft-worley-sip-dialog-03

Update contact information.

Revised the Current Implementations section.

Add discussion of the need for different contact URIs for different
AORs and of the "x-line-id" URI parameter.

Add discussion of GRUUs as contact addresses.

6. References

6.1. Normative References

   [1]   Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A.,
         Peterson, J., Sparks, R., Handley, M., and E. Schooler, "SIP:
         Session Initiation Protocol", June 2002.

   [2]   Rosenberg, J., Schulzrinne, H., and R. Mahy, "An INVITE-
         Initiated Dialog Event Package for the Session Initiation
         Protocol (SIP)", RFC 4235, November 2005.

   [3]   Roach, A., "Session Initiation Protocol (SIP)-Specific Event
         Notification", RFC 3265, June 2002.

6.2. Informative References

   [4]   Salzer, J., Reed, D., and D. Clark, "End-to-End Arguments in
         System Design", ACM TOCS vol. 2, no. 4, pp. 277-288,
         November 1984.

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